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Annual Reports PPC Vol. 2, 1957

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*Includes Citrus Blackfly

**Includes Barberry Eradication, Chinch Bug, European Chafer,
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UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION

SOUTHERN REGION

ANNUAL PROGRAM REPORT

MEDITERRANEAN FRUIT FLY

July 1, 1956 - June 30, 1957

Cooperating Agencies:

Regulatory, Control, Research, and Extension Agencies of
the Affected States

GOVERNMENT SECTION
OF SERIAL RECORDS

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Gulfport, Mississippi

C. C. Fancher
Regional Supervisor

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I. INTRODUCTORY

A. Statement of Problem

The Mediterranean fruit fly is one of the world's most destructive pests of citrus fruits and more than 200 other fruit and vegetable crops. Commercial fruit production in some countries or areas of countries has indeed become uneconomical because of widespread infestations of this pest. As the name implies, the Mediterranean fruit fly is a native of the Mediterranean area. It has been reported in Europe, Asia, Africa, South America, Central America, and the state of Florida in the United States. The first infestation in the United States was found in Florida in 1929, and involved 20 counties in the central part of the state. It was eradicated by the latter part of 1930 at a cost of about \$7,500,000. Even this enormous cost represented perhaps only a very small fraction of what the cost to growers would have been had the pest become permanently established. It was not found again in the United States until April of 1956, when it again was found in Florida in the Greater Miami area. Surveys made throughout the remainder of 1956 showed it to be present in 28 counties. Citrus fruits, except lemons and sour limes, are among the preferred hosts of the Mediterranean fruit fly. Some of its other preferred hosts in this country are peaches, pears, plums, and apples. Many vegetables, also, are subject to attack, but damage is usually considerably lighter than in the fruit crops. The exact amount of damage that this insect could do in the United States would be difficult to estimate; however, an idea of the potential cost of permitting the Mediterranean fruit fly to become established in Florida or other states may be gained from some of the following estimates of losses in other countries.

In Greece, as much as half of the citrus crop has been lost in some years because of this insect. In Sardinia in 1950, 90 percent of the peach crop was lost, and apple, pear, and orange crops were seriously damaged. In areas of Africa and South America, the pest has made commercial fruit production difficult, if not impossible. In addition to jeopardizing the multimillion dollar value of the Florida citrus crop, as well as the value of other susceptible crops produced in that state, this insect could cause damage running into millions of dollars each year if its unrestricted spread were permitted to neighboring states, such as Georgia, for instance, where the peach crop is a valuable asset to the agriculture of that state and has an annual value of from \$8,000,000 to \$10,000,000; South Carolina, where much the same is true, or states along the Gulf Coast where citrus and other fruit and vegetable crops have an enormous value.

B. Program Justification Statement

Federal participation in surveys seems amply justified in all states likely to become infested, as well as in the state of

Florida where control measures have been applied for more than a year in cooperation with the Pest Control agency of that state. The all-out attempt in the state of Florida to eradicate this pest, even though the cost will run into several millions of dollars, will be well worth the expenditure if its entry to other states or other counties of the state of Florida can be prevented. Surveys being made in other states of likely or possible infestations seem amply justified on the basis that initial infestations may be readily eradicated.

C. Program Objectives

The objective of the program is to eradicate the Mediterranean fruit fly from the state of Florida and to prevent its spread to non-infested states. Efforts have been made to locate and eradicate any infestation which may be present in the state of Florida, and thereby prevent its spread to noninfested areas by the strict application of regulatory activities, supported by eradication treatments with approved insecticides.

D. Changes from work plan

Several modifications became necessary during the season due to exhaustion of the lure which was used in the traps. At the beginning of the program, oil of angelica was used as the attractant and the world's supply of this material was rapidly exhausted. Synthetic lures then came into use in lieu of the oil of angelica; and this necessitated changes in all of the equipment used in servicing the traps, which included wicks, dispensing apparatus, etc. Modifications were made, also, in control operations in that bait spray treatments were changed from 10-day applications to weekly applications. At the same time, the insecticide formula was reduced by about 40 percent for these more frequent applications. Bait spray treatments following recovery of a specimen had to be continued considerably longer during the winter months than had been anticipated because of the extension of the life cycle beyond what had been expected.

E. Status of Infestation

The infested area of Florida, as determined by the surveys, included 28 counties which involved all of the state south of and including the counties of Hernando, Lake, Seminole, and Brevard. Eradication treatments in this area were required on approximately 800,000 acres. By the end of the reporting year, such eradication treatments were being applied to only 32,000 acres in 7 counties of the central part of this state, which included Hillsborough, Lake, Manatee, Orange, Pasco, Pinellas, and Polk. In sections where heavy infestations had existed at the beginning of the year, only 43 specimens were collected in 17 traps the latter part of June even though trap density had increased many fold.

II. PROGRAM HISTORICAL INFORMATION

The following is a brief summary of the highlights of the second visit of Mediterranean fruit fly to the United States.

On April 13, 1956, a citizen of Miami Shores, Florida, found larvae in grapefruits and gave them to the assistant county agent of Dade County, who forwarded them to the sub-tropical Experiment Station at Homestead for identification. They were forwarded in turn to the Entomology Department of the State Plant Board at Gainesville and the U. S. National Museum in Washington, D. C.

On April 17, the plant commissioner of the State Plant Board was informed of the tentative identification of the larvae as being the Mediterranean fruit fly. At his direction, McPhail traps were placed in the vicinity of Miami to collect additional specimens if possible. By April 19, eleven adult Mediterranean fruit flies were trapped and State and Federal officials were informed of the confirmation of the tentative determination as Mediterranean fruit flies. On April 23, Federal and State Quarantine and Plant Pest Control officials arrived in Miami to initiate an intensive survey to establish limits of infestation, and state regulations were invoked on that same day to prevent movement of infested products. By October 31, infestations had been found in 28 counties.

III. PROGRAM ACTIVITY DURING FISCAL YEAR

A. Planning and Direction

All plans for the survey, control, and quarantine activities of the Mediterranean fruit fly program were developed in conference between Florida State Plant Board and Plant Pest Control officials of the United States Department of Agriculture. The state was divided into several work districts and State and Federal employees were assigned to these areas to direct the survey, eradication treatments, and quarantine activities. Instructions for each phase of the operations were issued jointly by State and Federal coordinators to assure the adoption of uniform procedures in carrying out these several functions. All work performed in the several areas was continually under the review of supervisors in order that changes might be initiated quickly when and if necessary. Work performed by the contracting sprayers was also under continuous supervision in order to adequately protect the use of Federal and State funds.

B. Technical Assistance

Technical assistance was furnished throughout most of the program by entomologists of the Entomology Research Branch laboratory at Honolulu, Hawaii, where studies are made of the biology and control of various fruit flies and melon flies. Entomologists of this station spent considerable time in connection with

the Florida campaign assisting in planning the survey, control, and regulatory activities. Assistance was received, also, from entomologists of the Florida Experiment Station, particularly in relation to tolerances of host fruits to treatments and life history data under Florida conditions, as well as in connection with trapping operations. The Extension Service in Florida rendered valuable assistance, through distribution of information from their headquarters office and locally through their county offices, in keeping the public well informed of the type of program being conducted and ways and means whereby they could assist. The Florida citrus industry worked with program personnel in an advisory capacity, particularly in relation to quarantine regulations. Program employees worked very closely with grower organizations, farmers, nurserymen, county agents, industrial groups, and research workers in order to acquaint them with the necessary procedures to be followed in survey, eradication, and regulatory measures.

Technicians were assigned to work with shippers of regulated products to acquaint them with quarantine requirements, particularly as they related to fumigation facilities and/or required insecticidal treatments to permit movement of regulated materials. Mimeographed material was released at regular intervals to assist in keeping the public informed in regard to the program.

C. Survey

Objectives of the survey phase of this program were to locate and adequately delimit infestations and to check on the effectiveness of control measures in order to guide eradication treatments. Infestations, either new or recurring, were detected primarily through the use of traps. In the early stages of the program, liquid lure consisting of ammonium chloride and protein hydrolysate was used. The discovery that oil of angelica seed was attractive to the adult fly and could be used in a dry trap greatly expedited the program. Unfortunately, however, this oil was manufactured only in small quantities for use primarily in perfumes, and the supply was rapidly exhausted. It became necessary at that time to change to a synthetic lure which appears to be very effective. The wet lure traps were continued in use in a limited way as a check on the dry traps, but principally for the purpose of evaluating control treatments, since the wet lure was attractive to both sexes, whereas the lure used in dry traps was attractive only to the male fly. By examining the females caught in the wet traps, it was possible to determine whether specimens were escaping insecticidal treatments and becoming sexually mature. In addition to the trapping program, supplemental larval inspections were made, which aided in determining the limits of infestations and were an added check on the efficacy of control procedures. The combination trapping and larval inspection survey was carried on throughout the state

of Florida, with inspections being made in each county. During the peak of the trapping operations, more than 50,000 traps were used. The number of traps being used per county varied greatly, depending on the host plants prevalent in the area, the type of properties involved, and location of infestations. Basically the traps were tended through the use of automotive equipment, principally four-wheeled driven jeeps. However, it was necessary for trapping to be conducted on the outer islands, along rivers, and on lake shores through the use of boats. A helicopter made available by the Armed Services was put to good use in the trapping program in areas which were inaccessible to ground equipment. Fixed wing aircraft, also, was used along with the helicopter in seeking out and locating wild hosts. Traps were placed in such areas as the Everglades swamp and other locations not accessible to automotive equipment.

No record is available relative to losses caused by this insect during the past year. There were some instances of severe damage to home plantings in several of the metropolitan areas, particularly in Dade County, and to a few groves in the main citrus belt. Serious damage, however, did not occur because the insect was discovered in sufficient time to permit application of eradication treatments before it developed to damaging proportions.

It is recommended that an intensive trapping program be continued until it has been adequately demonstrated that eradication has been attained. The survey program can, however, be decreased with reductions being made first in those counties where eradication was first attained and in counties in the northern part of the state where the pest as yet has not been discovered. An intensive detection program should be continued, however, until eradication has been completed in all counties of the state. It is believed and recommended that studies should be continued in order to develop even more effective lures. The development of different lures may likewise make it desirable to modify trap designs. However, on the basis of current knowledge, the present trap appears to be quite adequate.

D. Eradication

The objective of the program in Florida is complete eradication of the Mediterranean fruit fly from the state. The technique used in eradication efforts has been based primarily on the use of bait sprays, the sprays consisting of the insecticide malathion applied at the rate of one-half pound per acre per application. Protein hydrolysate was mixed with the malathion at the rate of 1 pound per acre per application. The insecticide and protein were mixed with varying quantities of water, depending upon method of application. Aircraft was used principally in applying the sprays, and a total volume of 1 gallon per acre

was applied at each application. Supplemental applications were made through the use of ground equipment using from 2 to 100 gallons or more per acre depending upon type of equipment. Initially the spray applications were made at 10-day intervals in order to obtain a sufficient coverage before emerging flies could become sexually mature. As the program progressed, it became evident that the treatment would be more effective if applied at weekly intervals and at reduced insecticide levels. During the latter part of the fiscal year, three-tenths of a pound of actual malathion and six-tenths of a pound of protein hydrolysate were applied on the seven-day schedule. The bait sprays were continued for a minimum of 30 days following the recovery of the last fly during the early stages of the program; whereas during the winter months the duration of the treatments was extended in excess of 60 days of freedom from flies. In addition, as infestations were reduced in size during the latter part of the fiscal year, treatments were applied by aircraft for a minimum of 60 days following the last recovery of a specimen and supplemental ground treatments were applied around points of recovery for an additional 15 to 30 days, depending upon the previous population densities and other factors.

Surface treatments of dieldrin were applied under host trees in areas where heavy larval populations existed. Ten percent granular formulation was used at the rate of 5 pounds of actual toxicant per acre. As infestations became drastically curtailed, emulsifiable ethylene dibromide was applied as a flooding or soak treatment under host fruit trees where larval infestations were encountered. The application of this chemical resulted in a drastic reduction of fly populations. The treatment was an added supplement to the bait sprays and surface applications.

Many problems and difficulties were encountered in connection with the large scale spraying operations, and one of the most serious was injury to certain automobile finishes. Some types of paint seem to be very susceptible to damage by chemicals contained in the bait sprays while others suffered no damage at all. In addition, difficulties were encountered with the spray applications in areas where tropical fish were being produced. This applied particularly to the Miami area where the tropical fish industry is a multimillion-dollar undertaking. Another problem encountered -- and this, too, was principally in the Miami area -- was damage to the paint testing stations which are operated by paint companies. Most of these difficulties were obviated by a publicity program which was initiated to acquaint car owners with methods to be followed in protecting their automobiles from possible injury. Operators of tropical fish farms likewise were kept fully informed of the dates of each spray operation in order that adequate steps could be taken to protect pools from contamination. Operators of paint testing stations likewise were informed in order that they might protect their paint panels by covering them with plastic film before each spray treatment. Other difficulties included

complaints by home owners relative to spotting of clothing on wash days, spraying over school ground areas, etc. There were some complaints relative to the adverse effect of bait sprays on human health and complaints were voiced, also, in regard to the possibly harmful effect on wild life, livestock, etc. These problems were handled principally through a publicity program, as well as through individual contacts and group meetings.

Bait spray treatments were applied to almost 800,000 acres. The repeat treatments in this area resulted in materials being applied to approximately 6,500,000 aggregate acres. Dieldrin surface applications were applied to about 29,200 acres. The insect apparently has been eradicated from 21 of the 28 infested counties and populations have been reduced in the remaining 7 counties to the extent that only 43 specimens were recovered during the last month of the reporting period.

It is recommended that research be continued in an effort to develop an insecticide formulation which will provide effective control and at the same time would cause no injury to automotive finishes or to paint stations, etc.

E. Regulatory

Federal and State Quarantine regulations were promulgated to prevent the spread of the Mediterranean fruit fly from infested localities or areas. Fruits and vegetables were fumigated with approved dosages of ethylene dibromide or methyl bromide before being allowed to move from the regulated areas. In the early stages of the campaign, all of the citrus processing plants were located outside known infested counties; therefore, emergency bulk fumigation of citrus trees was allowed so that the fruit could go to juice plants which were located within the state and outside of the infested counties. Safeguards were established around processing plants which included the proper disposal of culls and peels, the application of bait sprays and dieldrin treatments, etc. Fresh fruit shippers constructed fumigation chambers in accordance with approved specifications, and adequate checks were maintained at all times on these facilities to assure their compliance with regulations. Other safeguards included checking fresh fruit establishments relative to such bait spraying of the area as was necessary, surface treatments, disposal of culls, etc. Treatments for nursery stock were evolved and consisted of a combination of bait sprays and dieldrin surface treatments, coupled with host fruit removal, and a necessary waiting period after fruit removal and insecticide treatments. These same regulations were applied to the large grass sod industry in south Florida.

For the coming year it is recommended, because of the progress made in eradication treatments, that dealer-carrier permits be canceled for all concerns and that very strict regulations be placed on the movement of any regulated products from the

remaining infested areas. In cooperation with research agencies, studies were undertaken to determine the ethylene dibromide and methyl bromide residues on host which were treated with these materials and studies, also, were conducted to determine tolerance to treatments for certain of the hosts. As a result of these studies, it was found that litchi nuts, certain varieties of avacado, and pineapples could be fumigated, and that the approved schedules were satisfactory for citrus, also.

Studies also were conducted relative to the possible use of an ethylene dibromide dip or soak as a means of certifying fruit and nursery stock. As a result, the ethylene dibromide emulsion was used on the control program during the later stages to drastically reduce soil populations. However, sufficient information has not been developed as yet to approve the treatments for quarantine purposes, either for nursery stock or for fruit.

Investigations were carried on to discover a means, if possible, of fumigating bulk fruit, rather than having it fumigated in boxes. Sufficient information has not been gathered to approve such treatments, except as related to the bulk treatment of citrus destined for plants outside regulated areas in the state of Florida. Studies were conducted regarding the possibility of fumigating fruit in boxes on trailer trucks, rather than removing the fruit from trucks and placing it in a special fumigation chamber. Fumigation was approved on trailer trucks in an especially constructed back-end fumigation house.

Tests were made in an effort to discover a paint which could be approved for treating the interior of fumigation houses. Such tests were made, also, with plastic films. As a result of these tests, several additional paints were approved for use in the fumigation chambers, and vinyl plastic sheets were approved for use in treating the fumigation chambers. However, on the basis of available information the plastic seals still had to be treated with a protective coat of paint.

A study was made relative to the possible use of combination bait sprays and host removal in vegetable producing areas in order to eliminate the need for risky fumigation. As a result of these tests, the combination sprays and the control of host fruits in the environs of vegetable growing areas was approved.

Investigation was made into the possibility of using a hammer mill as one of the procedures for handling the peel and culls, and this method was approved as an alternate means of disposal. The principal method used, however, consisted of processing the peel and culls through an approved feed mill.

The excellent cooperation which was received from military installations, state and federal experiment stations, Extension Service, newspapers, magazines, radio, television stations,

vegetable and citrus grower organizations, nurserymen's associations, tropical fish farmers, insecticide companies, paint testing stations, federal and state public health agencies, and others, had a considerable bearing upon the efficiency of the eradication program. Wide use was made of exhibits, color slides, radio and television programs, and leaflets prepared by the Department of Agriculture and the State Plant Board, as well as by industry. The use of this material greatly expedited the proper education of the public concerning the various phases of the survey, eradication, and regulatory program.

F. Methods Improvement

No recommendation.

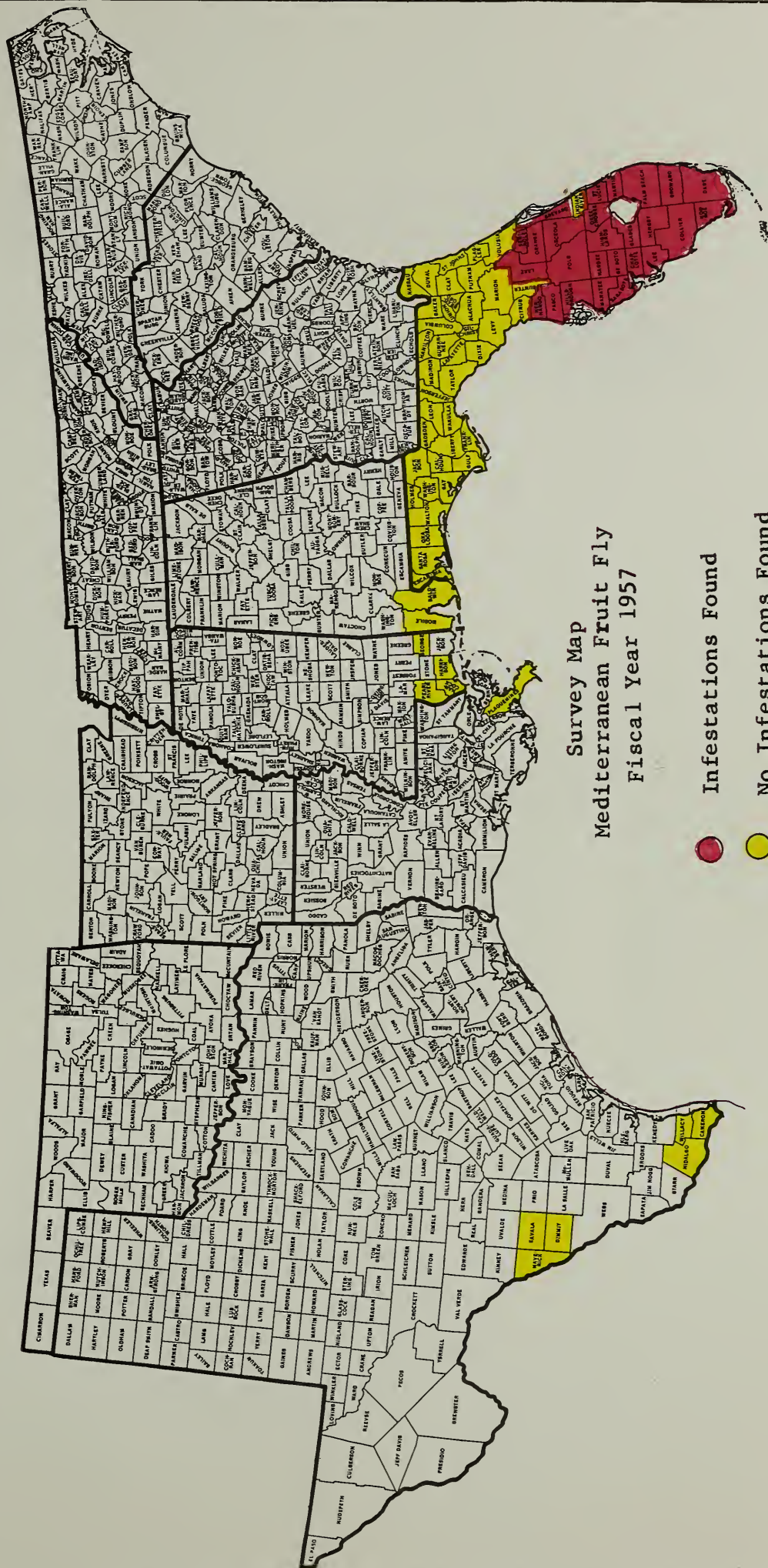
MEDITERRANEAN FRUIT FLY

Fiscal Year 1957

| State | Number Traps * | | Number Counties Found Infested | Bait Sprays | | Soil Treatment | |
|------------------------------|----------------|-----------------|---|----------------------------|-------------------------------|----------------|-------|
| | Florida | Other States | | Actual Acres Treated | Aggregate Acres Treated | Ground | Air |
| Alabama | | 22 | | | | | |
| Florida | 48,658 | | 9 | 800,000 | 6,079,428 | 19,422 | 4,330 |
| Georgia | | 395 | | | | | |
| Louisiana | | 140 | | | | | |
| Mississippi | | 316 | | | | | |
| South Carolina | | 100 | | | | | |
| Texas | | 240 | | | | | |
| Total | 48,658 | 1,213 | 9 | 800,000 | 6,079,428 | 19,422 | 4,330 |
| From Beginning of Program | | | 28 | 800,000 | 6,573,925 | 24,895 | 4,442 |

* June 30, 1957

SOUTHERN REGION PLANT PEST CONTROL DIVISION



Survey Map
Mediterranean Fruit Fly
Fiscal Year 1957

- Infestations Found
- No Infestations Found

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MEDITERRANEAN

FRUIT FLY CONTROL

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PROGRAM ANNUAL REPORT



UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION
WESTERN REGION

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION
WESTERN REGION

ANNUAL PROGRAM REPORT

MEDITERRANEAN FRUIT FLY CONTROL

July 1, 1956 - June 30, 1957

Cooperating Agencies:

Arizona State Department of Agriculture
California State Department of Agriculture
California County Departments of Agriculture

October 30, 1957
Oakland, California

Jim R. Dutton
Regional Supervisor

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INTRODUCTORY

Statement of Problem

In the Western Region there is no program of Mediterranean fruit fly control or survey as such. However, in the States of Arizona and California great interest has developed in this insect on account of the discovery of the infestation in Florida. As a preventive measure, both Arizona and California have run fruit fly traps throughout their fruit producing sections, in order to discover at the earliest date possible any infestations which might exist. The Plant Pest Control Division has participated in this program only to the extent of furnishing a small amount of Mediterranean fruit fly lure and the lending of Federally-owned fruit fly traps to the Arizona Commission of Agriculture and Horticulture, and also the lending of a considerable number of plastic traps to the California State Department of Agriculture.

Program Justification Statement

The interest which these two states have taken in the discovery of incipient infestations of the Mediterranean fruit fly is well understood. It is, of course, hoped that none will ever be found in this area. But, whether they do exist or not, it is believed that a timely trapping program, such as is being followed, is well justified and deserves whatever cooperation the Division can reasonably give.

Program Objective

The objective of the program as carried on in Arizona and California is the early detection of any possible Mediterranean fruit fly infestation.

PROGRAM HISTORICAL INFORMATION

On numerous occasions the larvae of the Mediterranean fruit fly have been intercepted at California ports. The discovery of an infestation, therefore, might not come as a great surprise, as it is recognized that the state is vulnerable to an invasion by this pest through the shipment of infested fruit. Even before the Mediterranean fruit fly was found in Florida in the spring of 1956, California was conducting a general fruit fly trapping program. With the discovery of the fly in Florida, the program was intensified by both the State and County Departments of Agriculture.

Since Arizona has a sizeable citrus industry, it is natural that their growers should also become interested in the early discovery of an infestation of the Mediterranean fruit fly in their state if any existed. As a precautionary measure, as soon as the fly was found in Florida, traps were placed in operation by the Arizona Commission of Agriculture and Horticulture.

Although 2,000 traps were operated in California from July through October 1956, and 4,000 operated during the month of June 1957, and 300 during similar periods in Arizona, no Mediterranean fruit flies have been trapped.

On this survey the Arizona Commission of Agriculture and Horticulture spent \$2,516, the California State Department of Agriculture spent \$10,000, the County Departments of Agriculture in California \$7,500, and the Plant Pest Control Division contributed equipment and supplies to the estimated value of \$1,000. Total expenditures amounted to \$21,016.

PROGRAM ACTIVITY DURING FISCAL YEAR

Planning and Direction

All activities on this survey program were under the direction of the Departments of Agriculture of the states concerned.

Technical Assistance

Both of the above organizations received help and advice on trapping operations from the Plant Pest Control Division and from the fruit fly Laboratory in Hawaii.

Survey

Objective

Since no infestation of Mediterranean fruit fly is known to exist in either California or Arizona, the program outlined is simply one of early detection.

Procedures and techniques

Plastic traps and lures are the main method of detection used; however, this is supplemented to some extent by the cutting of fruit and inspection for larvae.

Changes recommended

Every effort should be made to develop more effective lures and better traps, or entirely new methods of detection be devised.

Regulatory

This entire program was one of survey as outlined above. Since there were no flies found, there have been no eradication or control activities, nor has there been any need for regulatory action.

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Plant Pest Control Division

COOPERATIVE AID RECEIVED

MEDITERRANEAN FRUIT FLY SURVEY

Fiscal Year 1957

Region Western

| 1 | | | | | | | | | | | | | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | |
|------------------------------------|--|--------------------------|-------------------|----------------------|-------|--------|-------|--------|--|--|--|--|--|----------------------------|--|-------------------------------|--|--------------------|--|---------|--|---|--|---|--|---|--|
| State and Source of Aid | | Cash and Equivalent Aid* | | | | | | | | | | | | Total of Cash & Equivalent | | Intangible Service Estimate** | | Source Grand Total | | Remarks | | | | | | | |
| | | Cash | Personal Services | Equipment & Supplies | Space | | | | | | | | | | | | | | | | | | | | | | |
| Arizona Commission of Agr. & Hort. | | - | 1,124 | 392 | - | 1,516 | 1,000 | 2,516 | | | | | | | | | | | | | | | | | | | |
| California | | 7,500 | - | 2,500 | - | 10,000 | - | 10,000 | | | | | | | | | | | | | | | | | | | |
| 40 Calif. County Depts. of Agric. | | 7,500 | - | - | - | 7,500 | - | 7,500 | | | | | | | | | | | | | | | | | | | |
| Total | | 15,000 | 1,124 | 2,892 | - | 19,016 | 1,000 | 20,016 | | | | | | | | | | | | | | | | | | | |

* Limited to direct appropriation, allotments from other sources, services and supplies for which there is an actual cash expenditure.

** Limited to services incidental to other activities for which only an estimated value is available.

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Plant Pest Control Division
EXPENDITURES BY SOURCE AND BY ACTIVITY
MEDITERRANEAN FRUIT FLY SURVEY

Region Western

Fiscal Year 1957

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---------------------------------|-------------------------|-------------------------|--------|---------|------------|------------------------|-------|-----------|
| Source of Cash & Equivalent* | Planning & Direction | Technical Assistance | Survey | Control | Regulatory | Methods Improvement | Other | Total |
| Plant Pest Control Division | | | | | | | 1,000 | 1,000**** |
| Other Organizations (Name) | | | | | | | | |
| Arizona Comm. of Agr. & Hort. | 300 | | 1,216 | | | | | 1,516 |
| Calif. Dept. of Agriculture | | | 7,500 | | | | 2,500 | 10,000 |
| Calif. County Depts. of Agric. | | | 7,500 | | | | | 7,500 |
| Subtotal-Other Organizations | 300 | | 16,216 | | | | 2,500 | 19,016 |
| Total (of PPC & Other) | 300 | | 16,216 | | | | 3,500 | 20,016 |
| Contributed Services** | | | | | | | | |
| Arizona Comm. of Agr. & Hort. | 500 | | | | 500 | | | 1,000 |
| Total | 500 | | | | 500 | | | 1,000 |
| Grand Total | 800 | | 16,216 | | 500 | | 3,500 | 21,016 |

* Limited to direct appropriation, allotments from other sources, services and supplies for which there is an actual cash expenditure.

** Limited to services incidental to other activities for which only an estimated value is available.

*** Use of Federally-owned fruit fly traps and small amount of bait.

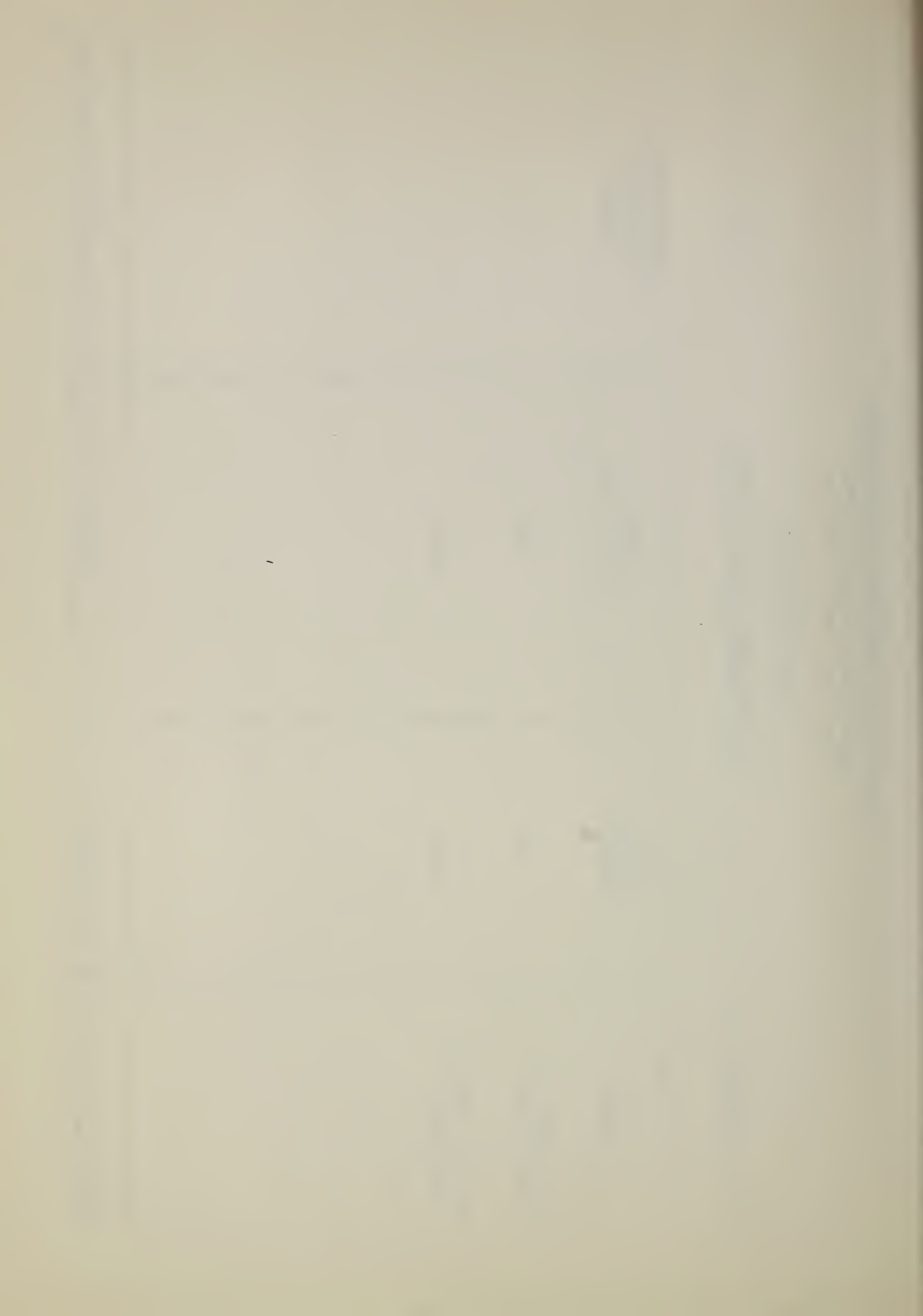
UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Plant Pest Control Division

FIELD ACTIVITIES

Region Western Fiscal Year 1957

MEDITERRANEAN FRUIT FLY SURVEY

| STATE | TRAPS OPERATED | TRAP INSPECTIONS | MEDITERRANEAN FRUIT FLIES TRAPPED |
|------------------------------------|-------------------|---------------------|---|
| Arizona Dept. of Agriculture | 300 | 7,200 | 0 |
| California Dept. of Agriculture | 4,000 | 56,000 | 0 |
| Total | 4,300 | 63,200 | 0 |





MELON FLY ERADICATION

• • •

PROGRAM ANNUAL REPORT

• • •

**UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION
WESTERN REGION**

* _____ *

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION
WESTERN REGION

ANNUAL PROGRAM REPORT

MELON FLY ERADICATION

July 1, 1956 -- June 30, 1957

Cooperating Agencies:

California State Department of Agriculture
Los Angeles County Department of Agriculture

October 30, 1957
Oakland, California

Jim R. Dutton
Regional Supervisor

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INTRODUCTORY

Statement of Problem

On July 24, 1956, an employee of the Los Angeles County Department of Agriculture took a specimen of the melon fly, Dacus cucurbitae, from a fruit fly trap he was operating on the campus of the University of California at Los Angeles. The fly was a non-gravid female. It appeared to be in the usual condition of a live fly having been drowned in a wet-bait type trap.

The trap in which this fly was taken was being operated for the purpose of detecting the possible presence of fruit flies such as the Mexican, Mediterranean, Oriental and melon. A hurried, but thorough, larval inspection of the University grounds was made, and additional traps set out in the surrounding area as rapidly as possible. No melon fly larvae could be found and no other melon flies were trapped.

The melon fly has long been known for the injury it can inflict upon some fruits and many vegetables. Although no other evidence of its presence in California could be detected, the very fact that one fly had been trapped was sufficient evidence that an incipient infestation of this pest had been established. If this incipient infestation was to be eradicated, prompt action was needed. Accordingly, an eradication program was developed which included trapping, spraying and host inspection. It was continued throughout the fiscal year in cooperation with the State and County Departments of Agriculture.

Apparently the campaign was a complete success. No other melon flies were trapped, nor were any infested melon fly hosts discovered.

Program Justification Statement

Prior to the discovery of the melon fly in the trap in Los Angeles, this fruit and vegetable pest was not known to exist in the United States. Its ability to cause extensive injury to many hosts of economic importance, however, had been well authenticated. In Hawaii, it is one of the most destructive pests. Wherever it is established, the normal production of many fruits and vegetables is continued only under great handicap and additional expense. In view of the damage this pest could cause to California's extensive fruit and vegetable industry, prompt action designed to eradicate the incipient infestation was indicated.

Program Objective

The sole objective of the program was to eradicate the melon fly from the United States. As nothing was known of the extent of the problem beyond the taking of the one fly in Los Angeles County, it was decided to concentrate all trapping, inspection and spraying activities in that area during the early part of the campaign. Traps were operated, however, by other County Departments of Agriculture throughout the State. As no additional flies were found, all eradication activities were carried out in Los Angeles County.

PROGRAM HISTORICAL INFORMATION

The melon fly, of possible Indo-Malayan origin, is known to exist in Australia, Ceylon, Southern China in the area of Canton, Hong Kong, and Macao, in Formosa, Hawaiian Islands, Japan, Java, Philippine Islands, Singapore, and the Island of Timor. World-wide, there are 79 plants which are listed as larval hosts.

PROGRAM ACTIVITY DURING FISCAL YEAR

Planning and Direction

The melon fly eradication campaign was a cooperative venture conducted by the Agricultural Department of Los Angeles County, the California State Department of Agriculture and the Plant Pest Control Division. Each organization assumed certain well defined duties and areas of operation. Each organization fulfilled its obligations. At frequent intervals during the year the cooperators reviewed the progress of the program and made such minor adjustments as conditions warranted.

Before the program got under way the facilities of each co-operator were surveyed. Traps were needed at once. The Division had some glass traps available and these were put into use without delay. The Division likewise had a few employees with fruit fly trapping experience. These employees were assigned to the program and remained on this work until substitutes could be recruited and trained. The Plant Pest Control Division was prompt in hiring five trap operators and in furnishing a year's supply of melon fly bait for all traps operated by the three cooperators. It also purchased for use on the program approximately 3,000 plastic traps. The Division's contribution to the program amounted to \$20,855.

The Agricultural Department of Los Angeles County assigned several employees to the problem of trap operation and host

inspection. In addition, it furnished office space and clerical assistance during the early weeks of the campaign. The County's contribution amounted to \$32,808.

The California State Department of Agriculture, in addition to assuming a large part of the responsibilities for the operation of traps and making inspections for infested hosts, was entirely responsible for the application of sprays in the treatment area. The State Department of Agriculture expended \$135,472 on the campaign.

Technical Assistance

The Entomology Research Section laboratory at Honolulu rendered invaluable aid in recommending a specific bait for use in the traps and also through consultation with Messrs. Christenson and Steiner on various problems involved.

Survey

The trapping operations conducted on this program could be classified as "survey" effort. The purpose was to discover additional infestations, if any existed. None, however, were found.

The cooperative program in Los Angeles County continued from August 4, 1956 to April 30, 1957. As no additional flies were trapped and no infested fruit found, it was decided to discontinue the program in Los Angeles County as of April 30. Surveys in southern California were continued by the Plant Pest Control Division on a limited scale, however, until June 30. The California State Department of Agriculture, in cooperation with several county organizations, plans to continue to operate fruit fly traps over much of the State. At the peak of the program 8,009 traps were in operation. Trap days during the period amounted to 1,771,667 on 7,687 properties.

Eradication

In addition to trapping and host inspection throughout the entire period, eradication sprays were applied and possible host fruits and vegetables collected by personnel of the California State Department of Agriculture. In this respect 44,133 host plants were sprayed on 3,114 properties.

Regulatory

On this rather unusual program there was no interstate quarantine involved. The area where the one fly was trapped was largely a consuming rather than a producing one. Had it developed that a widespread infestation existed, proper regulatory safeguards could have been put into operation without delay. The Bureau of Plant Quarantine of the California State Department of Agriculture and the Counties, however, did maintain an active regulatory program to prevent the spread of the melon fly. On this activity \$45,735 was spent by the State and County organizations.

Methods Improvement

The best known trapping and inspection techniques were employed. The old McPhail wet-bait and the new dry Steiner traps were used. Likewise, both types of bait were exposed.

Other

Cooperation received from the State and County Departments of Agriculture was excellent.

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Plant Pest Control Division

COOPERATIVE AID RECEIVED
MELON FLY ERADICATION

Fiscal Year 1957

Region Western

| State and Source of Aid | 1 | | 2 | | 3 | | 4 | | 5 | 6 | 7 | 8 |
|-------------------------------|--------------------------|-------------------|--------------------------|-------------------|----------------------|-------|-------|--|------------------------|--------------------------------|--------------------|---------|
| | Cash and Equivalent Aid* | | Cash and Equivalent Aid* | | Equipment & Supplies | | Space | | Total of Cash & Equiv. | Intangible Service Estimate ** | Source Grand Total | Remarks |
| | Cash | Personal Services | Cash | Personal Services | Equipment & Supplies | Space | | | | | | |
| States | 135,472 | | | | | | | | 135,472 | 19,444 | 154,916 | |
| Counties | 32,808 | | | | | | | | 32,808 | 26,291 | 59,099 | |
| Total for Period of Survey | 168,280 | | | | | | | | 168,280 | 45,735 | 214,015 | |

* Limited to direct appropriation, allotments from other sources, services and supplies for which there is an actual cash expenditure.

** Limited to services incidental to other activities for which only an estimated value is available.

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Plant Pest Control Division
EXPENDITURES BY SOURCE AND BY ACTIVITY
MELON FLY ERADICATION

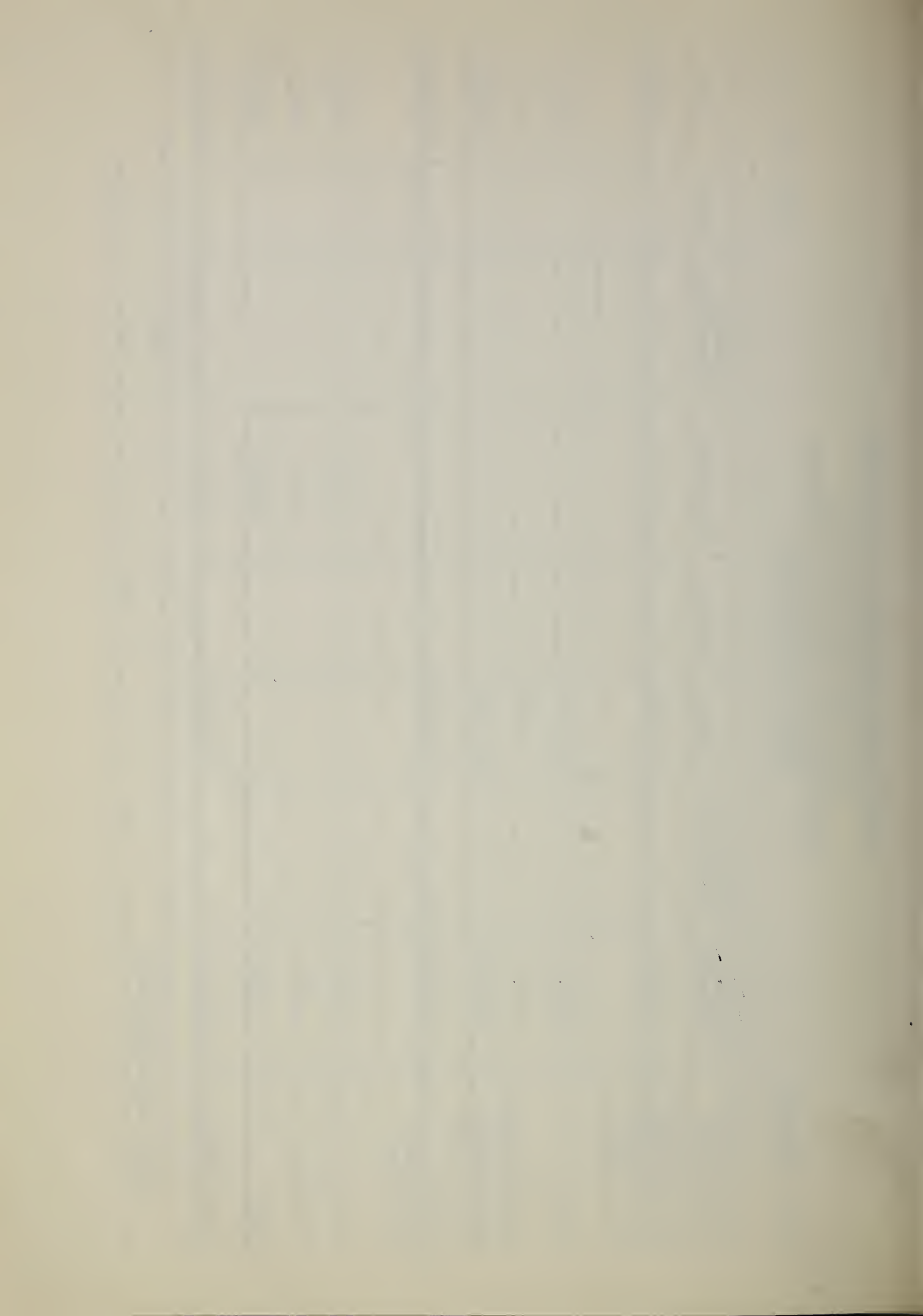
Fiscal Year 1957

Region Western

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|----------------------------------|-------------------------|-------------------------|---------|---------|------------|------------------------|-------|---------|
| Source of Cash & Equivalent | Planning & Direction | Technical Assistance | Survey | Control | Regulatory | Methods Improvement | Other | Total |
| Plant Pest Con- trol Division | 4,170 | | 16,685 | | | | | 20,855 |
| Other Organiza- tions (Name) | | | | | | | | |
| States | 27,000 | | 108,472 | | | | | 135,472 |
| Counties | 6,500 | | 26,308 | | | | | 32,808 |
| Subtotal-Other Organizations | 33,500 | | 134,780 | | | | | 168,280 |
| Total (of PPC & Other) | 37,670 | | 151,465 | | | | | 189,135 |
| Contributed Services** | | | | | | | | |
| States | 3,900 | | | | 15,544 | | | 19,444 |
| Counties | 5,250 | | | | 21,041 | | | 26,291 |
| Total | 9,150 | | | | 36,585 | | | 45,735 |
| Grand Total | 46,820 | | 151,465 | | 36,585 | | | 234,870 |

* Limited to direct appropriation, allotments from other sources, services and supplies for which there is an actual cash expenditure.

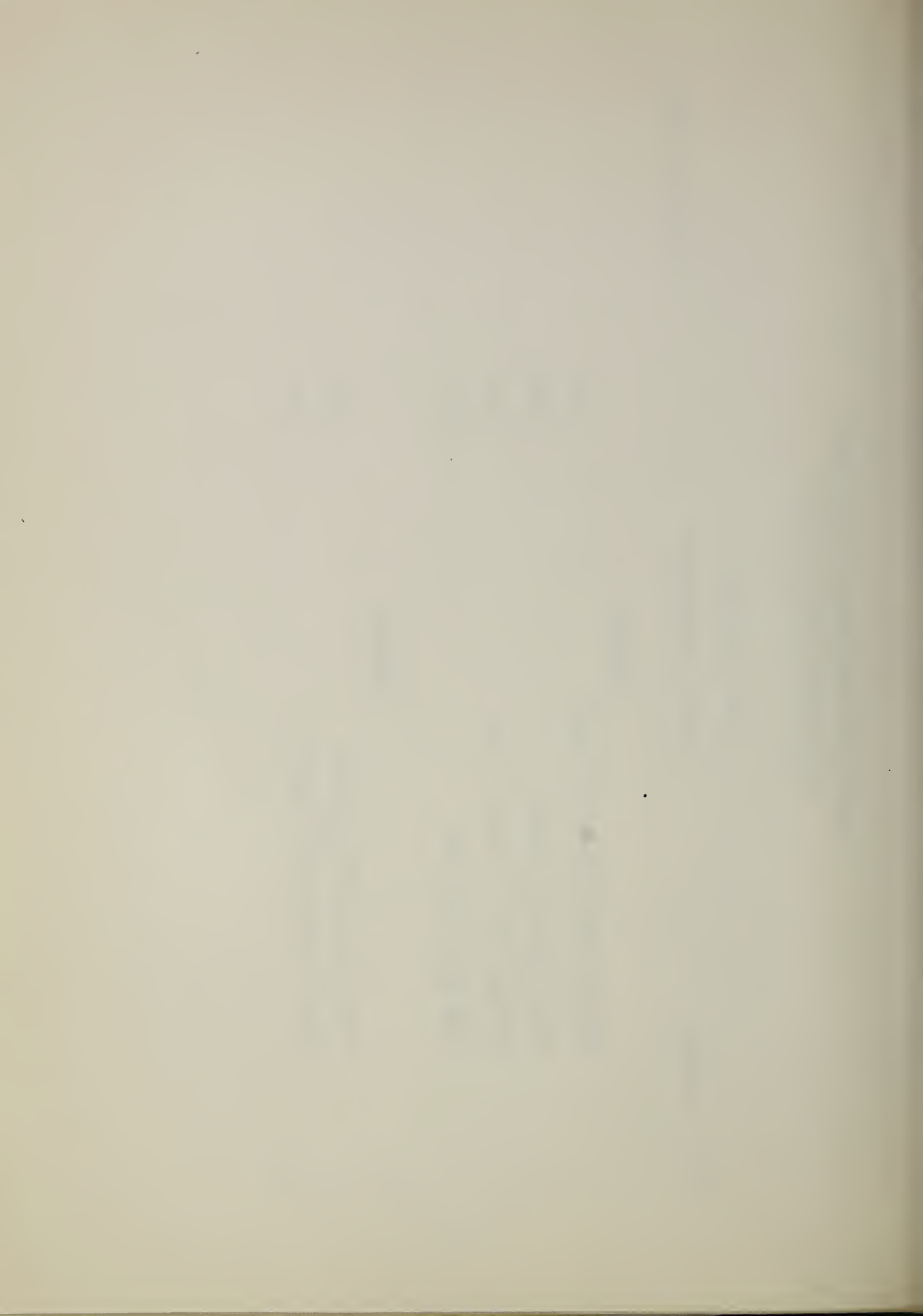
** Limited to services incidental to other activities for which only an estimated value is available.



UNITED STATES DEPARTMENT OF AGRICULTURE
 Agricultural Research Service
 Plant Pest Control Division

FIELD ACTIVITIES

| Region <u>Western</u> | <u>MELON FLY ERADICATION</u> | Fiscal Year <u>1957</u> |
|-----------------------------------|------------------------------|-------------------------|
| | <u>Trapping</u> | |
| Average number properties trapped | 3,506 | |
| Total properties trapped | 7,687 | |
| Average number of traps in use | 8,009 | |
| Trap days during year | 1,771,667 | |
| | <u>Spraying</u> | |
| Number of properties sprayed | 3,114 | |
| Number of host plants sprayed | 44,133 | |





UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION

SOUTHERN REGION

ANNUAL PROGRAM REPORT

MEXICAN FRUIT FLY

July 1, 1956 - June 30, 1957

Cooperating Agencies:

Regulatory, Control, Research, and Extension Agencies of
the Affected States

DEC 6 1957
Gulfport, Mississippi

C. C. Fancher
Regional Supervisor

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I. INTRODUCTORY

A. Statement of Problem

The Mexican fruit fly, Anastrepha ludens, an insect native to northeastern Mexico, attacks a wide variety of fruit, including citrus, mangoes, quince, peaches, sapotes, pears, apples, and pomegranates. This insect is a strong flier, and is easily carried on infested fruits and all types and kinds of transportation conveyances. So long as the primary infestation in Mexico exists, the chief concern of Plant Pest Control officials is preventing the general spread of this fly into and within the United States. In recent years, fruit losses in Texas attributable to this fly have been very low.

B. Program Justification Statement

The problem varies considerably from season to season, being contingent upon the number of flies crossing the Rio Grande, the volume of fruit produced, and other related factors. Program activities involve (1) the operation of traps to provide an index as to probable degree of infestation, (2) rigid inspections of orchards for larval infestations, and (3) the treatment of fruit in the packing plants by means that will safeguard other fruit areas from infestation. These and other related services are accomplished through the enforcement of the provisions of Quarantine No. 64 regulating the movement of host fruit from the infested areas. The enforcement of this quarantine is the responsibility of the Plant Pest Control Division. When the operation of road stations becomes necessary, the Texas Department of Agriculture furnishes a part of the personnel required to accomplish this inspection. It is the responsibility of the Texas citrus industry to construct, maintain, and operate treatment rooms in the various packing houses that are located throughout the areas under quarantine.

C. Program Objective

This insect is known to fly considerable distances in search of suitable hosts in which to reproduce, and at present there is no economic method of preventing its northward migration into the citrus groves of southern Texas. The objective of the Mexican fruit fly control in the United States, therefore, is the prevention of the spread of this insect to other fruit-growing sections. To date, the enforcement of Federal-State quarantines regulating movement of citrus fruit from regulated to non-regulated areas has been highly successful.

D. Changes from Work Plan

No changes in work plans were made.

E. Status of Infestation

Migration of the Mexican fruit fly usually begins in November or December of each year, with larval infestations detected around March 1. This year was no exception.

Most of the adults trapped and all larval infestations found this year were confined to the three lower Rio Grande Valley counties. Inspections made outside the presently regulated area were all negative.

II. PROGRAM HISTORICAL INFORMATION

The Mexican fruit fly was first discovered in the lower Rio Grande Valley of Texas during the spring of 1927. As far as can be determined, this was its first entrance into the United States. It has been a problem to Mexican fruit growers of northeastern Mexico for a very long time.

From 1927 through the late 1930's, the Mexican fruit fly activities were conducted on the basis of eradication. Host-free periods were maintained, grove sanitation enforced, spray applied, and alternate host plants were destroyed. When it was definitely established that reinfestations were the result of annual migrations of the adult Mexican fruit fly from the infested areas of Mexico into the citrus groves of Texas, the control approach became one of containment and prevention of spread, rather than eradication. This policy has been in effect until the present. The Mexican fruit fly is a very serious citrus pest and can cause great damage when not controlled.

III. PROGRAM ACTIVITY DURING FISCAL YEAR

A. Planning and Direction

Program planning was directed by Regional, Area, and Sub-Area Supervisors, and District personnel. All phases of the work were planned, timed, and coordinated according to needs, i.e., trapping, grove inspection, treatment, and certification during definite and specific periods of the harvesting and shipping season. District leaders directed field activities in their respective districts.

B. Technical Assistance

Research workers gave valuable assistance during the year by authorizing post-package treatment of unwrapped but waxed citrus in all containers except the polyethylene bag.

Program personnel assisted research workers in the area during the year on ethylene dibromide fumigation experiments.

C. Survey

The objective was to determine the presence of adult flies in the groves and larvae in the fruit through the operation of traps and grove inspections. The presence or absence of infestations determined whether or not treatment of fruit moving to free areas was necessary.

The method of survey used was the operation of traps throughout the citrus area and examination of fruit in the groves.

Traps were operated on 298 properties in 6 counties, and larval inspections were made in 2,310 groves throughout the counties of the regulated area and in several counties outside, but near the regulated area. Infestations were found on 73 properties by larval inspections and 51 properties by trap inspections.

No commercial loss occurred in the 1956-57 crop, as most of the crop was harvested by the time infestations became heavy.

A more effective lure is needed for use in trapping the Mexican fruit fly.

D. Eradication or Control

The approach for the past several years has been one of containment and prevention of spread, rather than eradication.

The vapor-heat method of sterilization was used for many years but has now been largely replaced by the ethylene dibromide fumigation method of sterilization developed a few years ago. This new treatment consists of fumigating the fruit in properly constructed gas tight rooms for an exposure period of 2 hours.

During the 1956-57 crop season, 162,149 boxes (70 lbs. equivalent) were treated before shipment from regulated areas, of which 134,375 boxes were shipped to California.

Changes recommended include approval to treat citrus with EDB in polyethylene bags, fumigation of bulk citrus in trucks, and post-package treatment in metal-lined van trucks.

E. Regulatory

Certification activities included the enforcement of Federal-State quarantines regulating movement of citrus fruit from the regulated area to noninfested areas.

Inspection certificates and permits were issued for movement of fruit only after negative grove inspections, negative trapping results, or approved treatment.

Fruit from noninfested properties was allowed free movement from the quarantined area, while treatment was required of 162,149 boxes (70 lbs. equivalent) from infested properties.

It is recommended that the Master permit be replaced by the rubber stamp certificate on individual containers and on waybills or truck invoices.

F. Methods Improvement

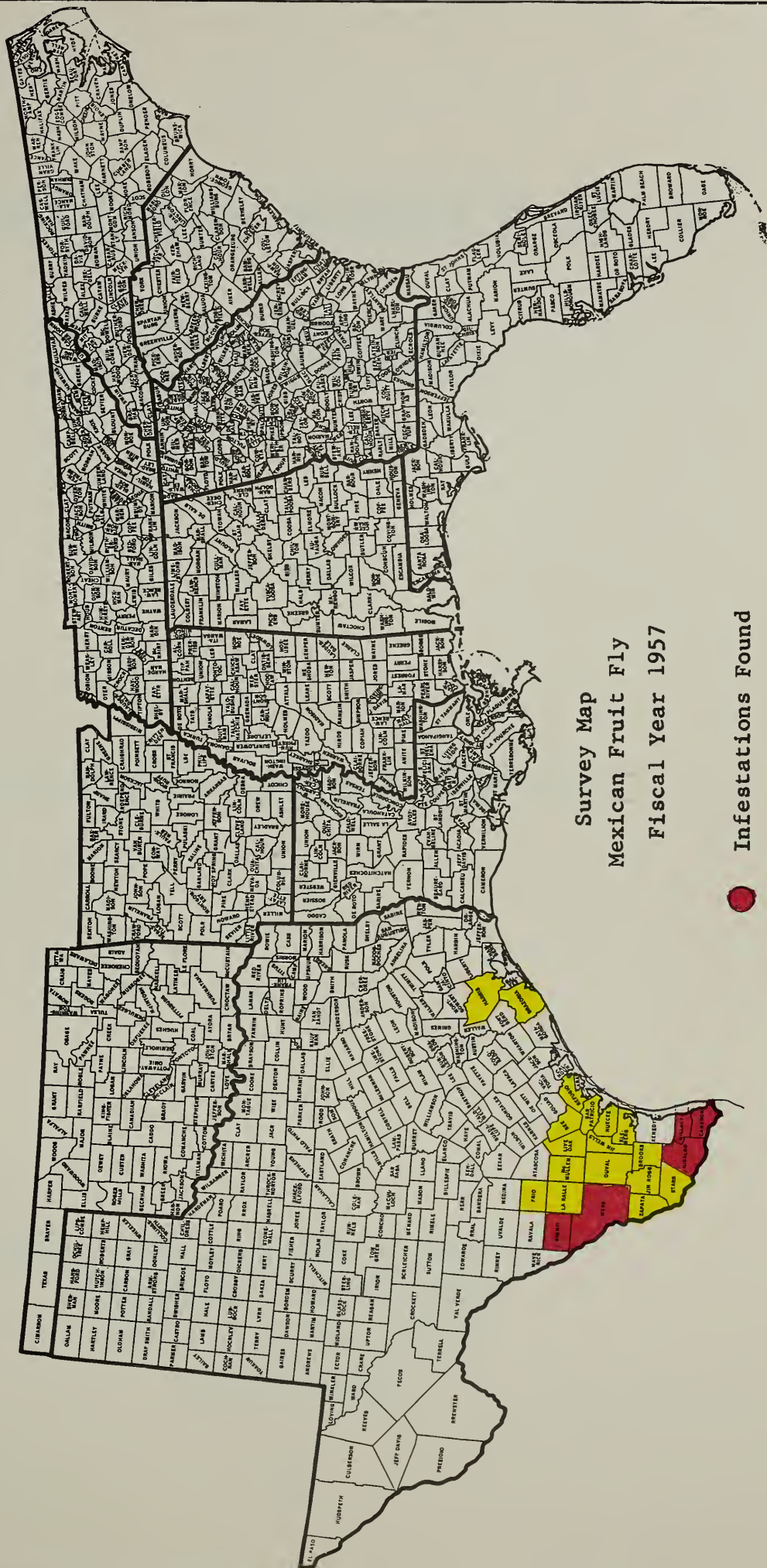
The amended Mexican fruit fly quarantine which is to be in effect next year will provide better control than has been possible under the old quarantine, as treatment will be required after specified dates thus eliminating certification based on results of grove inspections.

No new methods or materials were designed during the year other than approval of post-package treatment of citrus previously mentioned in this report.

G. Other

During this fiscal year, the citrus industry of Texas, as has been true in the past, gave satisfactory cooperation dealing with the phases of the program with which it is responsible.

SOUTHERN REGION
PLANT PEST CONTROL DIVISION



Survey Map
Mexican Fruit Fly
Fiscal Year 1957

● Infestations Found
● No Infestations Found

USDA-ARS-Gulfport, Miss. 10/31/57

MEXICAN FRUIT FLY CONTROL

• • •

PROGRAM ANNUAL REPORT

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**UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION
WESTERN REGION**

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION
WESTERN REGION

ANNUAL PROGRAM REPORT

MEXICAN FRUIT FLY CONTROL

July 1, 1956 - June 30, 1957

Cooperating Agencies:

Arizona State Department of Agriculture
California State Department of Agriculture
Imperial County, California Dept. of Agriculture
San Diego County, California Dept. of Agriculture

October 30, 1957
Oakland, California

Jim R. Dutton
Regional Supervisor

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PROGRAM HISTORICAL INFORMATION 2

PROGRAM ACTIVITY DURING FISCAL YEAR

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INTRODUCTORY

Statement of Problem

The Mexican fruit fly is not established in Arizona or California although flies have been trapped on several occasions in an area close to the International Border in California. Reliable data indicate that these flies move into California from northern Mexico as a result of infested fruit having been shipped from the interior to the cities of northern Baja California. The purpose of this control program is to prevent the establishment of this important fruit pest in an area noted for its great fruit production. Here are produced much of the nation's citrus, peaches, pears and many other favored hosts of this insect. If established here its control would add another expense to an industry already burdened with high production costs. Any reasonable expenditure designed to prevent the introduction of the Mexican fruit fly into Arizona and California is justified on account of the protection the program affords all American fruit growers.

Program Justification Statement

The Mexican fruit fly has long been known for its ability to infest fruit and inflict serious injury in commercial fruit plantings throughout Mexico and in southern Texas. This insect is spread primarily through its migratory habits and by the shipment of infested fruit. Owing to the lack of a wild host on the West Coast of Mexico, from whence it could migrate northward, and to the absence of good transportation facilities by which infested fruit could be moved near the International Border, this pest was not known to be in northwest Mexico prior to 1953. Early in January of 1954, however, flies were trapped in Tijuana, Mexico, and later in the year across the line in California. Since the date of the first discovery of this pest there, traps have been run in Baja California, and an active spray campaign conducted. Traps have also been operated and sprays applied in southern California with the result that while additional flies have been trapped no infested fruit has been discovered in California. It is believed this campaign has prevented the Mexican fruit fly from becoming established in the foremost fruit producing states of the nation.

Steps have been taken to lessen the amount of infested fruit being brought to the border cities in Mexico, but as good as these precautions are, trapping has shown that some infested fruit does escape detection, and flies occasionally are trapped in southern California. The trapping of these fruit flies indicates the necessity of continuing with preventive programs in this area.

Program Objective

In discussing the activities of the Mexican fruit fly control program it should be remembered that people carry fruit on trains, planes, motor vehicles and ships from the southern part of Mexico to the border areas. Much of this fruit is infested with the Mexican fruit fly and is capable of establishing infestations in localities close to our fruit growing sections. Our problem is (1) to prevent these infestations from becoming established in the United States, and (2) if established to eradicate them as rapidly as possible.

During the year under discussion this program has been followed: In a buffer area along the international border on the California side, traps have been operated on a regular schedule and the foliage of trees, in the more susceptible areas kept covered with poison spray. The current year's program is closely aligned with the long-range objective.

Deviations from Work Plans

The only item outlined in this year's work plan which was not followed as proposed has been the partial elimination of the trapping program in Arizona. No flies have been trapped there and it did not appear essential that traps be run after December 1956. Fruit, however, was inspected in Arizona Groves. No larvae were found.

PROGRAM HISTORICAL INFORMATION

Although the Mexican fruit fly has long been a problem in southern Texas, it was not known to be in northwest Mexico or southern California until 1954. The operation of traps and inspection of market fruit established its presence in Tijuana, Mexico in

January of that year, and later flies were found in southern California. The reason why this fruit pest had not been present at an earlier date is on account of the very limited transportation facilities which existed in the area prior to that date. Since 1954, however, northern Baja California has enjoyed all forms of modern transportation, including first class air and sea schedules and greatly improved highways. One result is that host fruits of the Mexican fruit fly are regularly intercepted at the airport, seaport and at the road stations.

During this past year more flies were trapped in northern Mexico than during any previous similar period. These findings indicate that the conditions which first occasioned the inception of the program have not changed, and that it needs to be continued if the Mexican fruit fly is to be prevented from becoming another pest to combat in American orchards.

PROGRAM ACTIVITY DURING FISCAL YEAR

Planning and Direction

Little or no change was made in the basic plan of field operations. Traps were operated by Federal personnel and fruit inspected on schedule. The general direction of the work in this Region was under the Area Supervisors of Arizona and California, who worked in close cooperation with the Departments of Agriculture of the states involved. The activities of the states and counties were under the supervision of appropriate officials.

In view of the fact that this program appears to be one for the prevention of establishment of infestation in Arizona and California, and as the program seems to be accomplishing its objective, the following actions are recommended for the coming year:

Continue trapping and inspection activities to discover incipient infestations.

Provide insecticides for spray applications in the susceptible areas. These sprays to be applied by California State Department of Agriculture personnel.

Provide replacement of traps being operated by both Federal and State organizations which are lost through vandalism or damaged.

Technical Assistance

Mr. W. E. Stone of the Mexico City Laboratory visited the area of operation on two occasions. His organization has assisted in the program by attempting to find an improved lure, test both wild and cultivated fruits for susceptibility to infestation of the Mexican fruit fly and advising on the general overall program.

Program personnel have assisted the State and Counties in laying out their programs and applying proper techniques in trapping, spraying and inspection.

Survey

Extensive trapping in an effort to detect the possible presence of Mexican fruit fly is carried on continuously throughout the year. New lures, traps and other methods of detection are constantly under trial or discussion in an effort to assure complete protection against any possible incipient outbreak.

The detection program presently followed will be continued this coming year, with the hope that a more effective lure and/or trap may be developed.

Eradication or Control (Prevention of Establishment)

The whole program is designed as a preventive against establishment of the Mexican fruit fly in the area under discussion. Traps are operated and fruit examined to discover the presence of flies. Sprays are applied to kill any that may be present before they have time to oviposit in the fruit.

Regulatory

There were no interstate regulatory activities involved. The Bureau of Plant Quarantine, California State Department of Agriculture, and several of the southern Counties, however, maintained a strict intrastate quarantine. These activities required the expenditure of \$46,735.00.

Methods Improvement

The following three recommendations are made for improving the program's field activities:

It is a recognized fact that the present brown sugar and water lure being used in the traps is not very effective. Since the presence of flies is detected by traps a much better lure is greatly needed.

This recommendation has as its objective the prevention of establishment of the Mexican fruit fly in northern Mexico and southern California. Although the trees on both sides of the International Border have been kept covered with spray, it is evident from trap recoveries that the spray is not killing the flies very rapidly. A much faster killing insecticide would be a welcome addition to the program.

In order to have a poison spray cover available at all times throughout the year frequent applications of spray are necessary. A spray which would be more effective over a longer period would be a distinct advantage to the program.

Other

Cooperation received during reporting year:

The Bureau of Entomology, California State Department of Agriculture, is actively engaged in the program with all of its extensive facilities. This organization operates traps, makes all the spray applications, examines fruits, treats soil, and identifies all the specimens collected. Its budget for 1956-57 amounted to \$82,836.00.

The County of San Diego likewise operates traps and makes fruit inspections. Its direct expenditure for Mexican fruit fly control was \$21,730.00. Imperial County contributed to the program in the form of furnishing office space at El Centro, California, in the estimated amount of \$1,000.00

In Arizona, some small assistance is received from the Department of Agriculture for the operation of traps and the inspection of host fruits. In view of the absence of known

infestation, however, this assistance is not on a planned program basis and no employee is regularly assigned to these duties.

It appears that the assistance being given on this program by the State Departments of Agriculture of Arizona and California and the Counties involved is adequate and need not be increased during the forthcoming year.

UNITED STATES DEPARTMENT OF AGRICULTURE

Agricultural Research Service

Plant Pest Control Division

COOPERATIVE AID RECEIVED

MEXICAN FRUIT FLY CONTROL

Region Western

Fiscal Year 1957

| State and Source of Aid | 1 | | 2 | | 3 | | 4 | | 5 | 6 | 7 | 8 |
|----------------------------|--------------------------|--|------|--|----------------------|-------------------------|-------|------------------------------|-------------------------------------|--------------------------|---------|---|
| | Cash and Equivalent Aid* | | Cash | | Personal Services | Equipment & Supplies | Space | Total of Cash & Equiv. | Intangible Service Estimate** | Source Grand Total | Remarks | |
| | Cash | | | | | | | | | | | |
| States | 82,836 | | | | | | | 82,836 | 19,444 | 102,280 | | |
| Counties | 21,730 | | | | | | | 21,730 | 27,291 | 49,021 | | |
| Total This Period | 104,566 | | | | | | | 104,566 | 46,735 | 151,301 | | |

* Limited to direct appropriation, allotments from other sources, services and supplies for which there is an actual cash expenditure.

** Limited to services incidental to other activities for which only an estimated value is available.

Fiscal Year 1957

Region Western

| | |
|---|----------|
| Number of properties sprayed | 137,744* |
| Number of trees sprayed | 907,022 |
| Amount of material used (Gallons) | 94,034 |
| Number of acres brushland sprayed | 3,207 |
| Amount material used (Gallons) | 21,800 |
| Number of spray applications since beginning of Program | 61 |

* Applications by California State Department of Agriculture.

| | <u>Federal</u> | <u>State</u> | <u>County</u> |
|---------------------------------------|----------------|--------------|---------------|
| Monthly average of traps used | 1,650 | 1,172 | 205 |
| Monthly average of properties trapped | 150 | 363 | 176 |
| Monthly average of traps inspected | 6,600 | 5,017 | 822 |

| Number of properties inspected - All Agencies | 45,331 |
|---|--------|
|---|--------|

No infested fruit found in California or Arizona.

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Plant Pest Control Division
EXPENDITURES BY SOURCE AND BY ACTIVITY
MEXICAN FRUIT FLY

Region Western

Fiscal Year 1957

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|----------------------------------|-------------------------|-------------------------|---------|---------|------------|------------------------|-------|---------|
| Source of Cash & Equivalent* | Planning & Direction | Technical Assistance | Survey | Control | Regulatory | Methods Improvement | Other | Total |
| Plant Pest Con- trol Division | 8,600 | | 34,237 | | | | | 42,837 |
| Other Organiza- tions (Name) | | | | | | | | |
| States | 11,900 | | 70,936 | | | | | 82,836 |
| Counties | 4,350 | | 17,380 | | | | | 21,730 |
| Subtotal-Other Organizations | 16,250 | | 88,316 | | | | | 104,566 |
| Total (of PPC & Other) | 24,850 | | 122,553 | | | | | 147,403 |
| Contributed Services** | | | | | | | | |
| States | 3,900 | | | | 15,544 | | | 19,444 |
| Counties | 5,250 | | | | 21,041 | | 1,000 | 27,291 |
| Total | 9,150 | | | | 36,585 | | 1,000 | 46,735 |
| Grand Total | 34,000 | | 122,553 | | 36,585 | | 1,000 | 194,138 |

* Limited to direct appropriation, allotments from other sources, services and supplies for which there is an actual cash expenditure.

** Limited to services incidental to other activities for which only an estimated value is available.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION

MEXICO REGION FOR COOPERATIVE PROGRAMS
ANNUAL PROGRAM REPORT

MEXICAN FRUIT FLY AND CITRUS BLACKFLY

July 1, 1956 - June 30, 1957

Cooperative Agencies:

MEXICAN DEFENSA AGRICOLA
MEXICAN NATIONAL BLACKFLY COMMITTEE

September 16, 1957
Monterrey, N. L., Mexico

W. K. Clore
Regional Supervisor



UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION

MEXICO REGION FOR COOPERATIVE PROGRAMS
ANNUAL PROGRAM REPORT

MEXICAN FRUIT FLY AND CITRUS BLACKFLY
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Appendix

Program Statistical Tables

INTRODUCTORY

Statement of Problem

The Mexican fruit fly is native to Northeastern Mexico where it has long been a problem to Mexican fruit growers. It attacks a variety of fruits, such as citrus, mangoes, sapotes, peaches, pears, apples, quince, pomegranates, and many other hosts. It has spread throughout the Republic of Mexico to where in recent years it has become established on the West Coast as far north as the City of Hermosillo in the State of Sonora. Other significant finds were the trapping of the insect at Tijuana and Mexicali, Baja California, in 1954. The immediate problem is to prevent the insect from becoming established in the northern part of the states of Sonora and of Baja California, Mexico, and eventually reaching the fruit growing sections of the adjoining states of Arizona and California. The current losses to the citrus and mango fruit growers of Eastern Mexico where the Mexican fruit fly is well established run from an estimated eight percent to thirty-eight percent of the crops. No economic losses to the fruit industry have occurred in Baja California, Mexico, or California, U.S.A., since fruit flies have been trapped only in these areas, and no infestations have been permitted to become established.

Program Justification

Northern Sonora and Baja California, Mexico, are not known to have an established infestation of Mexican fruit fly at this time, and inasmuch as these two states border on the states of Arizona and California, U.S.A., an infestation of Mexican fruit fly in this part of Mexico would represent a real threat to the fruit industries of both Arizona and California.

Realizing the economic losses that would be suffered, a joint program of surveys and inspections has been established to detect the presence of the fly. If the presence of the fly is indicated, eradication is the immediate objective by spraying of infested areas with a formulation of malathion and yeast.

Under the authority of the Mexican Quarantine #2, inspections are maintained at road stations and other strategic points for the interception of susceptible fruit fly material. All of these operations are conducted under the joint authority of a "Memorandum of Understanding" between the agricultural authorities of both republics. They are likewise cooperatively supervised and financed.

Program Objective

The long term objective is (a) to prevent the Mexican fruit fly from becoming established in Northern Sonora and Baja California, Mexico, and ultimately into the States of Arizona and California, by a system of surveys and trapping operations in these areas, coordinated with an intensive eradication program where the fly's presence is indicated; (b) to prevent the reintroduction of the pest into the area by a system of inspection stations at strategic points on the highways and railroads into the territory, as well

as daily inspections of all passenger, express, and freight traffic at railway freight terminals, airports, and seaports, coupled with inspection of postal receipts at the principal postoffices.

To accomplish the long range objective, fruit fly traps are operated the year round in Baja California to detect the presence of adult flies. Coupled with the trapping operations are grove inspections of dropped fruit to see if fruit fly larvae are present. An all-out fruit fly eradication spray program is being conducted and is based on the findings of trapping operations or grove inspections.

Two highway inspection stations are in operation, one at San Luis, and the other at Benjamin Hill, Sonora. A fumigation chamber is operated at Benjamin Hill for the treatment of commercial shipments of citrus fruits and mangoes from the fruit fly infested areas of Mexico.

Mexican fruit fly inspections are also coordinated with pink bollworm inspections of railway traffic and cargo at Benjamin Hill which is a function of the pink bollworm program. Daily inspections of passengers, baggage, and express receipts, as well as cargo shipments at all airports in Northern Sonora and Baja California, are made of all incoming planes. The same applies to boats arriving at the seaport of Ensenada, Baja California, Mexico. A fumigation chamber is also operated at this port for the treatment of mangoes originating in the Territory of Baja California to the south. Postal receipts are inspected daily for quarantine material at Nogales, Sonora, and at Mexicali, Tijuana, and Ensenada, Baja California.

Status of Infestation

During the fiscal year 1957 fourteen fruit flies were trapped in Baja California. Four of these were taken in the fall of 1956 (3 in August and 1 in October) and ten in June, 1957. Numerous interceptions of infested fruits were made at the airports from passengers, baggage, and express shipments during the mango season which runs from mid-March through the first weeks of October of each year.

Based on the previous year's record the work requirements for the year emphasized the necessity for maintaining and strengthening the inspection stations and increasing the vigilance at all inspection points in order to survey and inspect the increased volume of traffic from all sources into Northern Sonora and Baja California, this to be coupled with an intensive trapping and survey program in conjunction with an all-out eradication spray program based on the findings.

It is believed as a result of the spray program, all fruit flies were destroyed during the year but, due to the possibility of reintroduction through contraband shipments of infested fruits, the essentials of the program as now set up must be continued.

PROGRAM HISTORICAL INFORMATION

The Mexican fruit fly has caused heavy economic losses to citrus and mango production in Eastern Mexico, its native home, for a number of years. As a consequence of improved transportation facilities and increased traffic from the interior of Mexico to Northwestern Mexico and the International Border, the Mexican fruit fly was introduced into Northern Baja California. During the year 1954 fruit flies were trapped at regular intervals from January to November in that area. One was taken across the line in Southern California August 9, 1954. Infested fruits were intercepted at the airports by inspectors employed under the cooperative quarantine program. There appeared to be no migration problem involved as in Northeastern Mexico.

An intensive eradication program was initiated cooperatively by the U. S. Department of Agriculture, the Defense of Agriculture of Mexico, and the State Department of Agriculture of California. This was begun late in the fiscal year of 1954 and continued vigorously through the fiscal year 1955. Although thousands of fruit fly trap inspections were made and large quantities of fruit examined for signs of larvae in 1955, both in the State of California, and Baja California, Mexico, only three specimens were detected, and these in traps, two at Ensenada, and one at Tecate, Baja California, which indicated that the objective had been attained, as it is believed the three flies were the result of the illegal entry of fruits infested with fruit fly larvae from the interior of Mexico.

In spite of the cooperative quarantine efforts, some infested fruits have entered Baja California each year since the initial discoveries, as evidenced by the interception of infested fruits at the many inspection points and adult flies taken from trap inspections.

Thus it has been necessary to continue the eradication spray program based on the results of an intensive trapping and inspection program, all of this coupled with strict quarantine and regulatory efforts.

PROGRAM ACTIVITY DURING FISCAL YEAR

Planning and Direction

The Chief of the Northwest Control Zone of the Defense of Agriculture of Mexico and the Area Supervisor and his assistant of the Plant Pest Control Division plan together the various activities, such as surveys, trapping operations, eradication efforts, and the enforcement of quarantine regulations which include the treatment of fruits and inspection of all types of traffic for quarantine commodities. The area is divided into districts and the different phases of the work program are under the direction of the district supervisors who work in cooperation with the Mexican authorities of the Defense of Agriculture.

Periodical work reports are required and studied and frequent visitations are made throughout the districts to discuss techniques and improvements, and

to evaluate the accomplishments with the supervisors, and observe the program activities first hand.

It is recommended that the program be continued for the coming year in all of its aspects as it is now being operated, with special emphasis on strengthening the traffic inspections.

Technical Assistance

Two visits were made by personnel of the Mexico City Laboratory of the Entomology Research Division to the Western Mexico Area to observe the procedures in the fruit fly eradication program and to study the problems first hand. Their conclusions were that their recommendations were being followed in the eradication spray program as well as trapping and survey operations and no changes were recommended. It is recognized that a better insecticide is desirable for an eradication spray program and that a more attractive lure would increase the efficiency of the trapping operations.

Survey

The purpose of the fruit fly survey was three-fold: First, to find the pest; second, to delimit it, and third, to determine the density of population as a check against the effectiveness of the eradication program.

Two methods of survey were employed for fruit fly detection. Traps were operated in all of the principal cities, as well as fruit growing areas of Northern Baja California, with special emphasis on distribution and concentration along the International Border. Second, fruit inspections were made of all dropped host fruits on the properties trapped in conjunction with the trap inspection as time would permit; host fruits on the city markets were regularly examined as a check on the effectiveness of the fumigation treatments, and to see if contraband shipments were by-passing or getting through our inspection stations.

Accomplishments

Fruit fly traps were operated throughout Northern Baja California and in San Luis, Sonora, this fiscal year. 1,061 traps were operated on 417 different properties which resulted in 33,766 trap inspections and the collection of 14 fruit flies from 13 properties. None of these flies were gravid. Examinations of dropped fruits for fruit fly larvae were made when available on all of the properties that were trapped, with negative results.

Daily inspections were made of the fruit markets during the mango shipping season to determine the effectiveness of the fumigation treatments and to detect contraband shipments, and to see if they were infested. Numerous collections of dead fruit fly larvae were taken on the various markets from treated mangoes, but in no instance were live larvae detected in fruits on the markets.

It is recommended that these same procedures be continued the next fiscal year, with no modification.

Eradication or Control

As a result of the trap inspections, the presence of Mexican Fruit Fly was indicated in the extreme northern portion of Baja California in those areas adjacent to San Diego County, California. It was believed from past experience that they could be eradicated from this new area through the application of poison bait sprayed within the infested zones.

Procedures

All hosts of fruit flies were sprayed at regular 21-day intervals with 8 pounds of 25% wettable malathion and 2 pounds of partially hydrolized yeast as an attractant per 100 gallons of water. This material was applied from high pressure sprayers mounted on pickup trucks, supplemented by the use of three-gallon pressurized knapsack sprayers for use in spraying small trees and not readily accessible dooryard plantings.

It is believed that eradication was accomplished in the fall of 1956 since no fruit flies were trapped from October 1, 1956 to June 17, 1957. It is very likely that the ten flies trapped between June 17 and June 30, 1957, resulted from contraband shipments of infested mangoes into the area.

During this fiscal year 282,107 trees were sprayed on 38,576 properties.

No immediate changes are contemplated in the eradication program, since it is anticipated that more flies will be trapped during the late summer and early fall, probably throughout the mango shipping season. The results will have to be evaluated at a later date when it is possible that some changes might be in order.

Regulatory

Objective

Under the authority of Mexico's Interior Quarantine #2 inspections are maintained at highway stations, railway points, airports, and a seaport, to regulate the movement of fruits and agricultural commodities to prevent the introduction and establishment of the Mexican fruit fly, as well as other dangerous insect pests into Northwest Mexico adjacent to the rich agricultural and fruit growing areas of California and Arizona in the United States.

Procedures

All highway traffic is inspected that passes through two road stations, one at Benjamin Hill, Sonora, approximately 90 miles north of Hermosillo, the furthestmost point north on the West Coast of Mexico that an infestation of Mexican fruit fly is known to be established, and another at San Luis, Sonora,

on the west side of the great Altar Desert, 16 miles east of the Colorado River Valley in Mexico.

Inspections are made of all passengers' baggage, express, and cargo shipments at the airports at Nogales, Sonora, and at Mexicali, Tijuana, and Ensenada, Baja California. Regular examination of postal receipts, as well as market inspections are conducted in the aforementioned cities for contraband shipments of fruits. All passengers' baggage, as well as freight cargo from boats arriving at Ensenada, the only seaport on the Northwest coast of Mexico, is inspected on arrival. Many interceptions of fruits infested with fruit fly larvae were made at the various inspection points this year.

Two fumigation chambers primarily for the treatment of mangoes originating outside of the states of Sonora and Baja California are operated, one at Benjamin Hill, Sonora, and the other at Ensenada, Baja California. These chambers are operated free of charge to shippers or handlers of the commodities. The treatment requires two hours exposure at 70 degrees Fahrenheit or above to ethylene dibromide gas at the rate of 10 ounces per 100 cubic feet under constant air circulation. The commodities are eligible for movement under certification after treatment without further restrictions.

Other

Cooperation (All Agencies)

The Mexican fruit fly program is a cooperative effort conducted through a Memorandum of Understanding between the Plant Pest Control Division of the United States Department of Agriculture and the Mexican Department of Agriculture. The Mexican Defense of Agriculture and the local Patronatos pay parts of the salaries of inspectors at road stations and all other inspection points. They also furnish the space and part of the equipment at all road stations and share in the operating costs. Automotive equipment is furnished for a number of the Mexican inspectors by the various Patronatos. All program activities are planned and directed by the Chief of the Northwest Control Zone and the Western Mexico Area Supervisor and his assistant. The enforcement of all quarantines and related regulatory work is the responsibility of the Mexican agricultural authorities.

A sum of \$850 was made available by the fruit organizations and industries of the State of California for use in the purchase of certain equipment needed at the various road stations and inspection points within the area.

The cooperative program has been highly successful as it is now operated, and there appears to be no justification for any radical changes or modifications. The direction has been harmonious and the sharing of responsibilities and expenditures equitable between both participating governments.

Funds Spent - (Refer to Statistical Table)

Associated Activities and Services
Meetings

The Area Supervisor and the Chief of the Northwest Protective Zone attended a conference on the cooperative work programs in Mexico at Mexico, D. F., April 23, 1957 among the Assistant Director General of the Mexican Defensa Agricola and his associates, the Assistant Director and the Administrative Officer, Plant Pest Control Division, ARS, U. S. Department of Agriculture, and the Regional Supervisor, Mexico Region for Cooperative Programs.

The Area Supervisor attended a meeting March 27 at the County Agricultural Center, San Diego, California, at which representatives of federal, state, and county agricultural agencies concerned with the Mexican fruit fly control program were present. Informal discussions of related problems and activities were given. It was recommended that a similar meeting be held June 4 and 5 at the same location and that representatives of the Fruit Insect Section of the Entomology Research Division be invited.

A second meeting, as recommended at the Mexican fruit fly control meeting of March 27, was held on June 4 and 5 at San Diego, California. The Assistant Regional Supervisor for the Mexico Region for Cooperative Programs, as well as the Area Supervisor, and the Assistant Area Supervisor for the Western Mexico Area were present. Mr. W. E. Stone from the Mexico City Laboratory; Dr. P. S. Messenger of the Research Center, Brownsville, Texas, and Dr. Loren F. Steiner, Honolulu, T. H., all of the Entomology Research Division, were in attendance and contributed their knowledge to the discussions and recommendations. Others in attendance and participating were representatives of the Western Region PPC Division, the California Area Supervisor and co-workers, the Chief of the California Bureau of Entomology, as well as the San Diego County Agricultural Commissioner and his staff.

(For Statistical Information of Program Activities see Tables in Appendix)

UNITED STATES DEPARTMENT OF AGRICULTURE
 AGRICULTURAL RESEARCH SERVICE
 PLANT PEST CONTROL DIVISION
MEXICAN FRUIT FLY

-8-

Region - Mexico

Fiscal Year 1957

TRAPPING AND SPRAYING

| State and Location | Visual Inspection | | Trapping | | | | Number Host Plants Sprayed | Number Boxes** of fruit Treated | Number Boxes** Moving to California |
|---|-------------------------------|-----------------|---------------------|----------------------|-----------------------|---------------------|----------------------------|---------------------------------|-------------------------------------|
| | Number * Properties Inspected | Trap Operations | Number Traps in Use | Number Prop. Trapped | Number Prop. Infested | Number Flies Caught | Number Prop. Sprayed | | |
| SONORA San Luis | | 320 | 64 | 20 | 0 | 0 | 0 | 0 | Trapping discontinued August 1956 |
| BAJA CALIFORNIA Ensenada | * | 5,700 | 142 | 54 | 0 | 0 | 3,354 | 29,832 | 36th spraying |
| Mexicali | * | 2,795 | 225 | 85 | 0 | 0 | 0 | 0 | discontinued Sept. 1956 |
| Tecate | * | 5,275 | 124 | 44 | 1 | 1 | 4,462 | 49,881 | 28th spraying |
| Tijuana | * | 19,676 | 506 | 214 | 12 | 13 | 30,760 | 202,404 | 43rd spraying |
| Cumulative since Beginning of Prog. | 1,346 | 162,742 | 1,061 | 417 | 107 | 137 | 121,921 | 1,139,521 | |
| Total Period June 1, 1956-June 30, 1957 | | 33,766 | 1,061 | 417 | 13 | 14 | 38,576 | 282,107 | |

* Inspections for Mexican Fruit Fly larvae were done as opportunity presented itself along with the trapping operations.

** Equivalent of 70 pound box.

UNITED STATES DEPARTMENT OF AGRICULTURE
 AGRICULTURAL RESEARCH SERVICE
 PLANT PEST CONTROL DIVISION
MEXICAN FRUIT FLY

Region - Mexico

Fiscal Year 1957

AIRPORT INSPECTIONS

| Location | Planes | Passengers Inspected | Pieces of Baggage Insp. | Express pkgs Inspected | Interceptions | |
|----------------------------|--------|----------------------|-------------------------|------------------------|---------------|--------|
| | | | | | Fruits | Plants |
| BAJA CALIFORNIA Tijuana | 2,934 | 77,036 | 121,875 | 50,104 | 1,258* | 116 |
| Mexicali | 1,178 | 11,879 | 24,211 | 7,687 | 157 | 30 |
| Ensenada | 410 | 435 | 702 | 675 | 34 | 14 |
| SONORA Nogales | 713 | 11,500 | 14,239 | 19,477 | 248 | 131 |
| Totals | 5,235 | 100,850 | 161,027 | 77,943 | 1,697 | 291 |

* 243 live fruitfly larvae were found in the 1,258 interceptions of fruit

MARITIME INSPECTIONS

| Location | Boats | Passengers Inspected | Pieces of Baggage Insp. | Cargo Inspected | Interceptions | |
|-----------------------------|-------|----------------------|-------------------------|-----------------|---------------|--------|
| | | | | | Fruits | Plants |
| BAJA CALIFORNIA Ensenada | 64 | 531 | 878 | 641,193 k.* | 24 | 17 |
| Totals | 64 | 531 | 878 | 641,193 k. | 24 | 17 |

* 641,193 kilos of agricultural products arrived in legal transit and were permitted to pass

1. The following are the names of the persons who have been appointed to the various positions in the organization of the National Council of the American People.

| Position | Name | Address | City | State | Year |
|----------------|---------------------|-----------------|----------|----------|------|
| President | John D. Rockefeller | 100 Wall Street | New York | New York | 1901 |
| Vice President | John D. Rockefeller | 100 Wall Street | New York | New York | 1901 |

MEMBERS OF THE NATIONAL COUNCIL OF THE AMERICAN PEOPLE

2. The following are the names of the persons who have been appointed to the various positions in the organization of the National Council of the American People.

| Position | Name | Address | City | State | Year |
|-----------------|---------------------|-----------------|----------|----------|------|
| President | John D. Rockefeller | 100 Wall Street | New York | New York | 1901 |
| Vice President | John D. Rockefeller | 100 Wall Street | New York | New York | 1901 |
| Secretary | John D. Rockefeller | 100 Wall Street | New York | New York | 1901 |
| Treasurer | John D. Rockefeller | 100 Wall Street | New York | New York | 1901 |
| Member at Large | John D. Rockefeller | 100 Wall Street | New York | New York | 1901 |

MEMBERS OF THE NATIONAL COUNCIL OF THE AMERICAN PEOPLE

3. The following are the names of the persons who have been appointed to the various positions in the organization of the National Council of the American People.

4. The following are the names of the persons who have been appointed to the various positions in the organization of the National Council of the American People.

UNITED STATES DEPARTMENT OF AGRICULTURE
 AGRICULTURAL RESEARCH SERVICE
 PLANT PEST CONTROL DIVISION
MEXICAN FRUIT FLY

-10-

Region - Mexico

Fiscal Year 1957

ROAD STATION INSPECTIONS

| Location | Vehicles Inspected | | | | Total Vehicles Inspected | Interceptions | |
|---------------|-------------------------------------|--------------------|--------------------------|-----------------------------|--------------------------------|---------------|--------|
| | Private autos & trucks w/o loads | Passenger Buses | Trucks w/ Misc. cargo | Trucks w/ Agri. products | | Fruit | Plants |
| SONORA | | | | | | | |
| Benjamin Hill | 54,571 | 5,811 | 13,620 | 9,118 | 83,120 | 6,289 | 201 |
| San Luis | 2,058 | 1,388 | 1,678 | 1,709 | 6,833 | 944 | 90 |
| Totals | 56,629 | 7,199 | 15,298 | 10,827 | 89,953 | 7,233 | 291 |

Remarks: Cotton interceptions made at these stations are listed in the Pink Bollworm report.

RAILROAD STATION INSPECTIONS

| Location | Trains Inspected | | Railway Cars Inspected | Passengers | Express Pkgs. Inspected | Interceptions | |
|-----------------|------------------|-------|------------------------------|------------|-------------------------------|---------------|--------|
| | Passenger | Cargo | | | | Fruit | Plants |
| SONORA | | | | | | | |
| Benjamin Hill | 365 | 256 | 6,716 | 319,941 | * | 976 | 88 |
| Nogales | * | * | * | * | * | 91 | 65 |
| BAJA CALIFORNIA | | | | | | | |
| Mexicali | * | * | 2,062 | * | 10,216 | 151 | 15 |
| Totals | 365 | 256 | 8,778 | 319,941 | 10,216 | 1,218 | 168 |

Remarks: Cotton interceptions made at these stations are listed in the Pink Bollworm report.
 * Figures not reported.

UNITED STATES DEPARTMENT OF AGRICULTURE
 AGRICULTURAL RESEARCH SERVICE
 PLANT PEST CONTROL DIVISION
MEXICAN FRUIT FLY

-11-

Region - Mexico

Fiscal Year 1957

FUMIGATION OF FRUIT

| Location | Kilos of Fruits Fumigated | | | | | Total |
|-----------------------------|---------------------------|---------|------------|-------------------------|------------|-----------|
| | Mangoes | Oranges | Tangerines | Limes & Lemons Sweet | Grapefruit | |
| SONORA Benjamin Hill | 817,576 | 297,040 | 3,000 | 1,405 | 1,550 | 1,120,571 |
| BAJA CALIFORNIA Ensenada | 132,202* | - | - | - | - | 132,202 |
| Total Kilos | 949,778 | 297,040 | 3,000 | 1,405 | 1,550 | 1,252,773 |

* Only fruit originating in the territory of Baja California.



UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION

MEXICO REGION FOR COOPERATIVE PROGRAMS
ANNUAL PROGRAM REPORT

MEXICAN FRUIT FLY AND CITRUS BLACKFLY
CITRUS BLACKFLY

July 1, 1956 - June 30, 1957

Cooperating Agencies

MEXICAN NATIONAL BLACKFLY COMMITTEE
and
MEXICAN DEFENSA AGRICOLA

September 16, 1957
Monterrey, N. L., Mexico

W. K. Clore
Regional Supervisor

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Appendix

Program Statistical Tables

INTRODUCTORY

Statement of Problem

The citrus blackfly is recognized as one of the most serious pests of citrus. Infestations may build up very rapidly and cause a total crop failure in as short a time as two years. The blackfly is widely distributed in the Republic of Mexico. However, the northern-most finding of the fly in Northwest Mexico was Hermosillo, Sonora. Infestations there, by means of constant surveys, are detected while still very light and eradicated by spraying with oil and rotenone. The citrus blackfly is not known to exist in Baja California, in Sonora north of Hermosillo, nor in the contiguous California-Arizona area in the United States. Therefore, the Plant Pest Control Division works cooperatively with the Mexican authorities to eradicate or maintain citrus blackfly population levels sufficiently low to minimize the hazard of spread. Also, cooperative road stations and inspection points, strategically located, are set up to intercept and destroy Mexican fruit fly and pink bollworm host material carried by northbound travelers and vehicles. Along with this work, the inspectors are instructed to intercept and destroy citrus blackfly material.

In Northeast Mexico, the citrus blackfly has been discovered in a number of groves in the State of Nuevo Leon. Most of the State of Tamaulipas lies within the biological control zone where light infestations exist. These remain a constant threat to the citrus areas of Nuevo Leon and the border area of Texas. Chemical control of incipient infestations in the citrus areas north of the biological control zone continues to be a problem.

Program Justification

In the past few years, the highway, railroad, and all other transportation facilities in Northwest Mexico have expanded and improved at a very rapid rate. As a consequence, travel and movement of products has increased sharply from and to Eastern and Southern Mexico, as well as the adjoining States of Arizona and California in the United States. With the improved communications, the hazard of an infestation of citrus blackfly becoming established in Baja California and Northern Sonora has increased. The fact that these areas are adjacent to the citrus areas of Arizona and California in the United States made the hazard one of mutual concern to Mexico and the United States.

The blackfly uncontrolled in the northeast of Mexico would soon reach the citrus areas of Texas. This would cause a constant financial burden to the growers of that area. By assisting in the control in Mexico, we reduce the hazard to our own citrus areas.

Program Objective

During the past year, all work carried out has been in line with the long term objective. Surveys were carried out cooperatively to detect the insect and any findings were sprayed with oil and rotenone to effect eradication. Road stations and inspection points, strategically located north of Hermosillo, established and operated cooperatively with the Mexican Defense of Agriculture to intercept pink bollworm and Mexican fruit fly hosts from travelers and vehicles proceeding north, were also operated to intercept citrus blackfly material, confiscate, and destroy it.

South of Hermosillo, the Mexican National Blackfly Committee operates a combined parasite-spray program at Guaymas aimed at eradication of the citrus blackfly. For the rest of Sonora and the State of Sinaloa, the committee has as its aim, the control of citrus blackfly through the release of parasites. The committee also operates a road station north of Guaymas to prevent entry of citrus blackfly into Hermosillo from Guaymas and another to the south of Guaymas to prevent entry of hosts of citrus blackfly into Guaymas.

The long term objective of this program is to prevent the blackfly of citrus from crossing the international boundary and becoming established in citrus producing areas of the United States.

Continued grove and city inspection has been done in Nuevo Leon and that part of Tamaulipas lying north of the biological control zone to locate and eradicate incipient infestations by use of insecticides.

Changes from Work Plan

The only significant change from the Work Plan has been the use of malathion as an insecticide by the National Blackfly Committee in the citrus groves, instead of the standard spray of oil and rotenone. The reason for this was that malathion could be used at any time regardless of the temperature without damage to fruit and foliage. Oil and rotenone spray is still being used in the cities and towns in order that there may be no toxic effect to animal life.

Status of Infestation

Infestations in Hermosillo, Sonora and other areas in Sonora north of Hermosillo, and in Baja California, have been confined to the Hermosillo area. An infestation of citrus blackfly has not become established in the Hermosillo area, but when infestations are found they are very light and obviously recurring through re-introduction from contraband material brought in from the south. Eradication of these recurring infestations has consistently resulted through spraying the infested trees and a reasonable surrounding area. During the past year,

eighty-eight trees and twenty-three properties were found very lightly infested, and through spraying with oil and rotenone, eradication was apparently obtained.

Infestations in the biological control zone remain well under control by parasites. Fluctuations occur in some localities due to high temperatures causing parasite mortality. Periodic checks are made to determine the need for re-introduction of parasites.

In the chemical control zones of Nuevo Leon and Tamaulipas there was an increase in the number of infestations over that of the previous year especially in groves. Prompt action by the spray crews of the National Blackfly Committee prevented further spread and all known infestations were quickly controlled.

PROGRAM HISTORICAL INFORMATION

The citrus blackfly is of Asiatic origin and in 1935 it was found to be present on the West Coast of Mexico. By 1949 it was found as far north as Hermosillo, Sonora. Expanded and improved transportation facilities resulted in increased travel and movement of various products from southern and eastern Mexico into Northwest Mexico. Continued expansion and improvement of the various facilities have served to further increase movement so that the advantages of comparative isolation and the natural barrier afforded by the Sierra Madres against entry of insects not previously established were nullified. Aware of the threat to their agriculture in the Sonora-Sinaloa-Baja California areas and the contiguous Arizona-California area, the Mexican Department of Agriculture and the Plant Pest Control Division initiated a program of cooperative surveys in Northwest Mexico to detect and delimit the citrus blackfly infestations.

When the blackfly was discovered in Tamaulipas and Nuevo Leon, the United States Department of Agriculture offered assistance in the eradication and control program. The cooperative arrangement for survey was initiated at Montemorelos, N. L. during the month of October 1949 and the first infestation was found January 24, 1950.

The eradication zone in the northeast lies north of the 24th parallel and all infestations found beyond this line are being eradicated by the use of chemical sprays applied by the National Blackfly Committee.

PROGRAM ACTIVITY DURING FISCAL YEAR

Planning and Direction

Planning and direction of the program is cooperative and involves two agencies. Surveys and the eradication spray program as well as parasite release, is a cooperative work carried on with the Mexican

National Blackfly Committee. Inspection stations within the chemical control zones of Sonora, Tamaulipas and Nuevo Leon are manned and operated by personnel of the National Blackfly Committee and all host plants of the blackfly carried by vehicles are confiscated and destroyed. Inspection stations north of Hermosillo, Sonora are operated in cooperation with the Mexican Defense of Agriculture. The Director of the Mexican National Blackfly Committee and the Regional Director confer frequently on the overall planning of the program. The Area Supervisors and the State Blackfly Committee executives of Mexico meet and plan the work to be done in the states under chemical control.

Technical Assistance

The essentials of the program of survey and eradication as now being carried out are based on findings and recommendations of the Fruit Insects Section of the Entomology Research Division.

The work of parasite release for control as carried out cooperatively in the region is under the general direction of Mr. H. D. Smith and is based on his findings and recommendations.

The program as is being carried out indicates its adequacy, as results obtained to present have fulfilled the requirements of the objective.

Survey

Surveys are cooperatively carried out in all the citrus areas in Mexican states north of the biological control zone. Visual tree by tree inspections are made of all trees in the cities and towns. In commercial areas a small crew makes a quick inspection of all the grove trees and when an infestation is found a large crew moves in and delimits the infestation. The trees are marked for the guidance of the spray crews which follow. After a period of approximately three months after the last spray application a reinspection is made of the sprayed area to determine whether or not live material remains which would necessitate a follow up spray.

The Mexican Blackfly Committee maintains small crews in the biological control zone inspecting areas where parasites have been released to note the effectiveness of the parasites. If for any reason the parasite population has become depleted reintroduction is made from heavily populated areas in order to maintain a control balance. This procedure may need to be repeated several times before the parasite becomes well established. Factors which may cause this imbalance are high temperatures, hurricanes, floods and application of insecticides in the vicinity of citrus orchards for control of insects on row crops.

Procedures

Survey procedures for citrus blackfly have undergone no essential changes. It is a time consuming process but no other procedure has been indicated which is as satisfactory. Crews of men are used in this work with individuals stationing themselves under trees and carefully looking over the foliage until they are satisfied a thorough inspection has been made, and then move to another tree to repeat the process. Concentration and patience, as well as good eyesight, are the chief requisites for this work, and crew members are selected with this in mind. Indications are that the procedure is adequate, and its efficacy is demonstrated that frequently only one leaf on a tree is found infested, and exhaustive inspection following the finding rarely discloses another infested leaf.

Accomplishments

Surveys were made during the year in cooperation with the Mexican National Blackfly Committee of all of the principal citrus areas in Northern Sonora. Surveys were also made in Northern Baja California, principally in areas bordering on the United States. In these areas the only infestations revealed were found in the Hermosillo area.

Surveys of Southern Sonora and in Sinaloa were also made by the Mexican National Blackfly Committee personnel.

Surveys were made during the year in cooperation with Mexican Blackfly Committee of all the principal citrus areas in the chemical control zone. In addition surveys were conducted in areas bordering the United States from Baja California to Tamaulipas in cities and towns wherever citrus trees are found. In the western area 88 trees were found lightly infested on 23 properties in and around Hermosillo. In the eastern area 3,213 trees were found infested on 183 properties in the states of Nuevo Leon and Tamaulipas. (Refer to statistical tabulations in Appendix.)

Recommendations for Coming Year

In view of the findings of heavier infestations than ever before in the state of Nuevo Leon, increased coverage of the areas surrounding the infestations should be made by the survey crews.

Eradication or Control

Objectives

From Hermosillo north in Sonora, and in Baja California, the objective is to eradicate any infestations that surveys reveal to be present. The Mexican National Blackfly Committee has as its objective the eradication of the established infestation at Guaymas, Sonora; and south, through

Sinaloa, the control by use of parasites of the widely distributed citrus blackfly infestation is the objective.

In the chemical control zones of the northern part of Mexico, the objective is to eradicate infestations both large and small. This is the only procedure by which we can expect to prevent the movement of the insect to the citrus areas of the United States. In the biological control zone it is the objective of the National Blackfly Committee to control to the minimum the blackfly by the use of parasites. Efficiency of biological control minimizes the likelihood of spread from that area to the eradication area.

Procedures

Following the finding of an infestation, as a result of surveys, all leaves found to be infested are pulled off and destroyed. Then the infested tree or trees and a surrounding area of host trees are sprayed thoroughly, using oil and rotenone. Several weeks following the spray application, a thorough inspection is made to determine if there has been survival.

Procedure as carried out by the Mexican National Blackfly Committee in Guaymas, Sonora, where eradication is the aim, is to release parasites to maintain control during hot periods when spraying is not practical, in order to reduce infestations present. When weather permits, spraying operations are resumed, with eradication in mind. This procedure, because of its having lowered the degree of infestation, gives indication of eventual success.

Accomplishments

All infestations found in Hermosillo during the past season were apparently eradicated. A good reduction of infestation in Guaymas gives promise of eventual eradication, while in South Sonora and Sinaloa, satisfactory control through release of parasites was obtained. All infestations in the chemical control zone of Tamaulipas and Nuevo Leon were eradicated but re-infestations occurred which necessitated further treatment.

Regulatory

Objective

The main objective is to prevent the spread of blackfly from the biological control zone to that under chemical control and more important, to prevent its spread to adjacent citrus growing areas of the United States.

Procedures

On the west coast, the National Blackfly Committee maintains a road station north of Guaymas, Sonora whose purpose it is to intercept and confiscate host plants of the blackfly. Two road stations, one at Benjamin Hill and the other at San Luis, Sonora, operated cooperatively by the Defensa Agricola and Plant Pest Control Division, inspect vehicular traffic and operate as additional checks on any prohibited plant material. In the eastern area, a quarantine road station is located at the 24th parallel in the state of Tamaulipas on the Mexico city highway a few miles north of the biological control zone; one at Linares, Nuevo Leon at kilometer 854; one north of Monterrey on the Nuevo Laredo highway; and one north of Monterrey on the Reynosa highway. The above-mentioned road stations are maintained and operated by the National Blackfly Committee. Their function is to inspect all north bound traffic for prohibited material and confiscate when detected. Trucks carrying packed citrus fruit from the quarantined area of Nuevo Leon and Tamaulipas to the ports of Brownsville and Laredo are inspected at packing sheds prior to loading to see that they are free of citrus leaves.

Accomplishments

Interceptions of blackfly host material are made at the various road stations, which point out the value of the work being done.

3,414 trucks carrying 1,694,943 boxes of citrus fruit were inspected for citrus leaves. Fruit was destined for Texas ports for export.

Methods Improvement

Suggestions for Coming Year

A study is under was by Mr. H. D. Smith of Entomology Research Division and Agronomists of the National Blackfly Committee to devise a more economical method of scouting for the blackfly.

Other

Cooperation

Surveys carried out in the region are cooperative. The cooperating agency is the Mexican National Blackfly Committee. The Plant Pest Control Division furnishes vehicles for transportation of blackfly committee inspection crews and drivers who assist in supervision of the crews. In spraying operations, the blackfly committee furnishes spraying equipment, insecticide, and shares supervision of crew members who are furnished by the Mexican National Blackfly Committee. All costs of all operations south of Hermosillo are borne by the Mexican National Blackfly

Committee, except the cost of the Plant Pest Control Division inspector who gives technical advice on parasite release in those areas.

In road station and other similar inspections, the cooperating agency is the Mexican Defense of Agriculture which shares in costs of all personnel doing this work; also, contributes buildings for road stations and shares in maintenance and costs of operations.

Road stations at Benjamin Hill and San Luis, Sonora are maintained cooperatively with the Defensa Agricola. All other road stations throughout the region are maintained solely by the National Blackfly Committee.

Funds Spent

Refer to table in Appendix.

UNITED STATES DEPARTMENT OF AGRICULTURE
 AGRICULTURAL RESEARCH SERVICE
 PLANT PEST CONTROL DIVISION
CITRUS BLACKFLY

Region - Mexico

Fiscal Year 1957

INSPECTIONS AND SPRAYING SUMMARY

| State | Inspections by State | | Infestations by State | | Control Applications | | | | | |
|-----------------|----------------------|-----------------|-----------------------|----------------------|----------------------|-----------------|-----------------|--------------|--------------|--------------|
| | Number Trees | Number Prop. | Number Trees | Number Properties | Property 1st | Property 2nd | Property 3rd | Trees 1st | Trees 2nd | Trees 3rd |
| Tamaulipas | 123,136 | 7,897 | 207 | 78 | 628 | 531 | 410 | 13,227 | 9,741 | 2,780 |
| Neuvo Leon | 471,699 | 11,911 | 3,006 | 105 | 615 | 603 | 601 | 38,632 | 17,435 | 14,522 |
| Coahuila | 875 | 74 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sonora | 210,035 | 3,327 | 88 | 23 | 88 | 0 | 0 | 5,365 | 0 | 0 |
| Baja California | 3,797 | 919 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 809,562 | 24,128 | 3,301 | 206 | 1,331 | 1,134 | 1,011 | 57,224 | 27,176 | 17,302 |

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION

SOUTHERN REGION

ANNUAL PROGRAM REPORT

MISCELLANEOUS PROGRAM SERVICES

July 1, 1956 - June 30, 1957

Cooperating Agencies:

Regulatory, Control, Research, and Extension Agencies of
the Affected States

DEC 6 1957

Gulfport, Mississippi

C. C. Fancher
Regional Supervisor

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| IMPORTED FIRE ANT. | 2 |

Barberry Eradication

Nurseries in the Southern Region, making applications during this fiscal year for shipping barberry and mahonia interstate in conformance with Federal Quarantine 38, were inspected by Messrs. A. J. Coppinger, Tom Van Zanden and George N. Holmes, Division representatives. Accompanying these men during this work in each state visited was the Area Supervisor concerned, or his representative. With this cooperative arrangement in effect this year, inspection work in the future will be accomplished by Division personnel permanently assigned in the states in which the nurseries requiring this service are located. The assistance provided by the Central Region in training our men is sincerely appreciated.

Chinch Bug

Each year usually during November and early December, cooperatively conducted surveys, to determine the populations of adult chinch bugs in hibernation, are made in the corn-growing sections of Arkansas and Oklahoma. As the overwintering bugs emerge from winter protection in the spring and move into small grain, a spring survey is conducted for the purpose of determining winter survival. The data obtained from these surveys is evaluated and mapped for use of interested farmers, agricultural groups, and others concerned with this problem. The farmers located in the areas threatened with this pest are also given timely control information by Federal and State officials.

Meteorological and other natural factors this year reduced the need for control to negligible proportions. The potential problem during fiscal year 1958 will not be known until the surveys are made during the last two months of 1957. The maps indicating the probable 1958 problem may be released by February 1958 to those interested.

European Chafer (Survey)

A survey for European Chafer, Amphimallon majalis, Raz, was conducted during May and June of 1957 in seven counties of North Carolina, with negative results. The counties in which the scouting occurred included Stanly, Onslow, Duplin, New Hanover, Pender, Rowan, and Wayne.

Based upon available reports and current information, the European chafer is not known to be present in any of the states within the Southern Region.

SECRET

1. The purpose of this document is to provide information regarding the activities of the [redacted] and the [redacted] in the [redacted] area. The information is being provided for your information and is not to be used for any other purpose.

SECRET

2. The [redacted] and the [redacted] have been active in the [redacted] area for some time. They have been engaged in a variety of activities, including [redacted] and [redacted]. The [redacted] has been particularly active in the [redacted] area, and has been engaged in a variety of activities, including [redacted] and [redacted].

3. The [redacted] and the [redacted] have been active in the [redacted] area for some time. They have been engaged in a variety of activities, including [redacted] and [redacted]. The [redacted] has been particularly active in the [redacted] area, and has been engaged in a variety of activities, including [redacted] and [redacted].

SECRET

4. The [redacted] and the [redacted] have been active in the [redacted] area for some time. They have been engaged in a variety of activities, including [redacted] and [redacted]. The [redacted] has been particularly active in the [redacted] area, and has been engaged in a variety of activities, including [redacted] and [redacted].

During fiscal year 1958, Division personnel in the Region will continue to check for this insect in connection with regular field observations and inspections. It is also planned during the same period to scout more extensively for this insect in the State of North Carolina than in 1957.

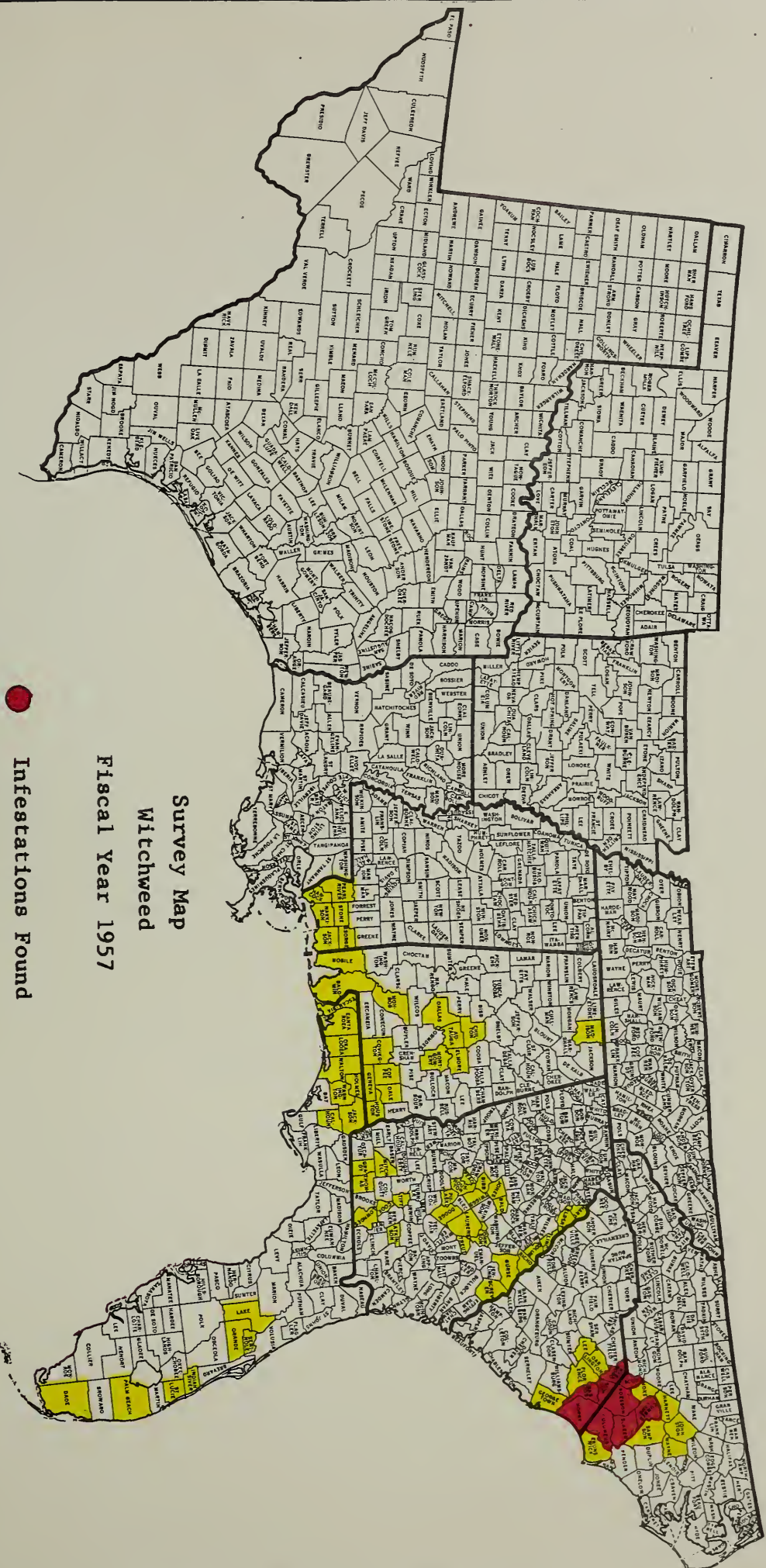
Imported Fire Ant (Solenopsis saevissima v. richteri)

Public interest concerning the imported fire ant problem reached an all-time high during the early part of 1957 and prompted the Southern Region to conduct a rapid survey throughout the eleven southern states to determine the probable acres of land infested with this pest. The results of this work are given below:

| <u>State</u> | <u>Estimated Acres Infested</u> |
|----------------|---------------------------------|
| Alabama | 13,300,746 |
| Arkansas | 5 |
| Florida | 714,654 |
| Georgia | 46,254 |
| Louisiana | 3,124,400 |
| Mississippi | 3,471,630 |
| North Carolina | 0 |
| Oklahoma | 0 |
| South Carolina | 2 |
| Tennessee | 0 |
| Texas | 1,375,440 |

A later survey in the State of Arkansas revealed approximately 11,153 infested acres, all in Union County. These infestations were treated under a cooperative State-County-City-Landowner program between May 20 and June 4, 1957. The results of this work, as of this writing, are very satisfactory. Ten percent heptachlor, in granular form, was applied by aircraft at the rate of 2 pounds of technical heptachlor per acre. The total cost of this work was \$4,140.

SOUTHERN REGION PLANT PEST CONTROL DIVISION



- Infestations Found
- No Infestations Found

Survey Map
Witchweed
Fiscal Year 1957

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION
CENTRAL REGION

ANNUAL PROGRAM REPORT

PEACH DISEASES

July 1, 1956 - June 30, 1957

Cooperating Agencies:

Plant Pest Control Division, Agricultural Research
Service, U. S. Department of Agriculture
In cooperation with
State, County, and Local Agencies

October 21, 1957
Minneapolis, Minn.

R. O. Bulger
Regional Supervisor

Peach Diseases

Phony peach disease has been found in limited areas in only three states in the Central Plant Pest Control Region and peach mosaic has not been reported in this region to date. Therefore, a complete annual program report has not been prepared. The following summary of accomplishments is submitted.

Phony Peach - Commercial peach orchards in Johnson, Massac, Pulaski, and Union Counties, Illinois, and in Durkin County, Missouri, were inspected and the diseased trees removed. Much less than 1 percent of the trees inspected were found diseased.

Phony Peach Disease Control - Fiscal Year 1957

| State | County | <u>Properties</u> | | <u>Trees</u> | | |
|--------------|---------------|-------------------|-----------|---------------|----------|----------|
| | | Number | Number | Number | Number | Number |
| | | Inspected | W/Disease | Inspected | Diseased | Removed |
| Illinois | Johnson | 12 | 0 | 29,050 | 0 | 0 |
| | Massac | 7 | 1 | 39,400 | 1 | 1 |
| | Pulaski | 8 | 2 | 6,290 | 10 | 10 |
| | <u>Union</u> | <u>17</u> | <u>3</u> | <u>43,180</u> | <u>6</u> | <u>6</u> |
| Subtotals | 4 | 44 | 6 | 117,920 | 17 | 17 |
| Missouri | <u>Durkin</u> | <u>41</u> | <u>4</u> | <u>34,743</u> | <u>4</u> | <u>4</u> |
| Subtotals | <u>1</u> | <u>41</u> | <u>4</u> | <u>34,743</u> | <u>4</u> | <u>4</u> |
| Grand Totals | 5 | 85 | 10 | 152,663 | 21 | 21 |

Peach Mosaic - Inspections of peach orchards and of nursery stock have been made in Missouri and Illinois. This fiscal year 480,604 trees were inspected on property operated by Starks Nursery, Louisiana, Missouri. Of this number, 198,163 trees were located across the Mississippi River in Illinois. Early in July 1957, 18,600 trees were inspected at the Neosho Nursery, Neosho, Missouri, and 29,340 at the Starks Nursery at Marionville, Missouri.

The Plant Pest Control Division and the State Departments of Agriculture in Illinois and Missouri cooperated in both phases of the work.

Table 1. - Summary of Associated Activities - Fiscal Year 1957

| State | : Public : | Presentations | | | : Feature : | Extent These Aids Were Used** : | | | | | | |
|----------------|--------------|---------------|---------|--------|-------------|------------------------------------|-------------|-----------|---------|--------|-------------|-----------------|
| | : Meetings : | : | : | : | : & News : | : Bulle--: Circu--: Infest. Maps : | | | | | | |
| | : Attended: | Talks: | Slides: | Films: | Radio: | TV | : Stories*: | Exhibits: | tins* : | larg*: | & Posters : | Special Reports |
| FEDERAL: | | | | | | | | | | | | |
| Phony Peach - | | | | | | | | | | | | |
| Illinois | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Peach Mosaic - | | | | | | | | | | | | |
| Missouri | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| - | - | - | - | - | - | - | - | - | - | - | - | - |
| COOPERATORS: | | | | | | | | | | | | |
| Peach Mosaic - | | | | | | | | | | | | |
| Missouri | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 10 | 0 | 0 | 0 |
| Totals | 1 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 10 | 0 | 0 | 2 |

*Written by Federal personnel for release direct or through cooperators.

**Conservative estimate.

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RECORD

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I. INTRODUCTORY

A. Statement of Problem

Peach mosaic occurs in the Southern Region in the states of Arkansas, Oklahoma, and Texas, and the problem varies in the different states. In Arkansas, the primary purpose of the program is the protection of an important commercial area in the southwestern part of the state. An incipient infestation was found in this area several years ago, and the program has had as its primary aim complete eradication before sufficient headway could be gained for it to become a serious problem. Another important phase of the program in Arkansas is inspection of commercial orchards as a safeguard to an important nearby peach nursery industry. Nurserymen in this area, and for that matter over most of the state, obtain most, if not all, of their budwood from the southwest or the Nashville-Highlands commercial peach area.

In Oklahoma, the problem is primarily concerned with nursery certification in Bryan County, in the southern part of the state. However, periodic surveys are made in other parts of the state in order to maintain a check on the progress of the disease.

In Texas, the problem involves nursery and budwood certification, as well as protection of commercial orchards in certain sections of the state. The most serious problem has been and continues to be in east Texas, particularly in Smith and Cherokee Counties, where mosaic incidence has been rather high for a number of years.

Mosaic control is considered as one of the "holding programs" of the Division, and it appears necessary to continue it as such until resistant varieties of peach or other control techniques have been developed. Mosaic is caused by a virus which is transmitted from diseased to healthy trees by a microscopic eriophyid mite. In the spring, the newly formed leaves on affected trees show mottled areas caused by a clearing of the normal green color into light or faded areas intermingled with the normal green areas. Other symptoms are shortened internodes and profuse branching. Commercial damage is the result of the effect on the fruit which becomes smaller in size and is very bumpy and otherwise irregular, having a somewhat shrunken appearance. The disease is capable of completely destroying an orchard of a susceptible variety within 3 to 6 years.

B. Program Justification Statement

Peach mosaic may be readily transmitted from infected to healthy trees by buds or grafts, and infected nursery stock can be the means of distributing the disease to areas where it has not yet occurred. Careful annual inspections of nurseries and budwood sources, therefore, are considered to be the most important functions of the control program. Of almost equal importance

are the surveys which are made annually in areas not known to be infested with the disease, as well as in areas known to be lightly infested, in order to maintain as close a check as possible on the course the disease may be taking and to eradicate incipient outbreaks of the disease in important nursery or commercial peach-growing areas. Another phase that seems to justify full participation in this program is the protection of the economy of areas ideally suited to the production of fresh fruit for the early market by annual inspection of orchards in areas where the disease is generally prevalent, in an attempt to reduce and eventually eradicate the disease from such areas.

The original long-term objective of the peach mosaic program was complete eradication; however, as the program progressed, it soon became evident that eradication could not be accomplished immediately because of factors such as (1) varieties which were tolerant to the disease; (2) the presence of the disease in other closely related hosts which, in many instances, exhibited no symptoms; and (3) the fact that for many years the insect vector was unknown. The program, therefore, finally evolved into a holding program and has been conducted on that basis for several years. It apparently will be necessary that it continue as such until other control measures, such as the possible development of resistant or immune varieties of peach or an adequate control for the mite vector, can be developed. Research divisions are conducting investigations on these various points.

During the reporting year, all phases of the program were guided toward the long-range plans in that all known nurseries and budwood sources in the regulated areas were inspected, and, in the commercial peach areas of the generally affected sections of the several states, complete orchard inspections were made and the trees found to be diseased were promptly removed by the orchard owners.

C. Status of Infestation

No mosaic infected trees were found during the year in the commercial area of Arkansas, and it now appears that eradication may be possible in that locality within a very short time. In Oklahoma and Texas, the infestation status changed very little from that of the previous year.

II. PROGRAM HISTORICAL INFORMATION

The first report of peach mosaic in the United States was in Texas in 1931, and shortly thereafter in Colorado. Since that time, it has been found in Arizona, Arkansas, California, New Mexico, Oklahoma, and Utah; and it is known to occur also in the Republic of Mexico in the states of Baja California, Coahuila, and Chihuahua. The disease was found in Texas by phony peach inspectors who were working in orchards near Bangs in Brown County and Clyde in Callahan County. Mosaic had been observed in orchards in Mesa County, Colorado, as early as July of 1931, but definite determination was not made until

May of 1934. It was found in southern California in a limited district in 1933, and for a time it was designated as "The 1933 Peach Disease." In 1935, mosaic was found in Utah in the vicinity of Noab, in 1936 in Arizona and New Mexico, and in 1947 in Arkansas.

III. PROGRAM ACTIVITY DURING FISCAL YEAR.

A. Planning and Direction

Prior to beginning the inspection and control program in the affected states, consultations are held with the state officials, definite plans as to counties or areas to be worked are designated, and assignments of personnel are agreed upon by the cooperating state and federal agencies. Under the present organizational structure, the work in each state is under the direction of the area supervisor and is directly supervised by the district inspector. Technical assistance to the control program is provided by research entomologists and pathologists of the various research divisions, by state quarantine officials, and by extension entomologists and pathologists and their technical staffs. Various phases of the control program are based entirely on recommendation of the control pathologists and entomologists who are assigned to the problem. Extension entomologists and pathologists cooperate by calling meetings of orchardists, farmers, and others who are interested in the program, and state quarantine officials cooperate by enforcing quarantine measures and by providing an adequate portion of the inspection staff.

Orchardists are kept currently informed of progress in the programs each season, and are provided with literature as new releases are made relative to any improvements in the control program.

B. Eradication or Control

Eradication of outlying incipient infestations has always been high in the list of important objectives of the program. The program, as has been followed, apparently has been successful in eradicating the disease from several counties, and it now appears that the disease may have been eradicated from the several counties comprising the Nashville-Highlands area of southwest Arkansas. In the more generally infested areas, the primary objective for some years has been to afford economic control to the cooperating orchardists. This was continued during the fiscal year, and in Arkansas, Oklahoma, and Texas, 956,807 trees on 1,710 properties were inspected, and 292 trees on 84 properties were found to be infected with mosaic. All infected trees were removed. As stated elsewhere in this report, no infected trees were found in the Nashville-Highlands area of Arkansas, and only 5 were found in Oklahoma. The other 287 infected trees were in east Texas.

C. Regulatory

Objectives of the regulatory phase of the program are to prevent further spread within the states where infection is known to exist and particularly to prevent spread to states where the disease is

not known to be present. Since the disease is readily spread to nursery understock through the medium of infected buds, the inspection and certification of budwood sources is considered a most important adjunct to the nursery certification procedure. All budwood sources proposed by the nurserymen are carefully inspected each year. Such inspections include all trees in the budwood block and all peach trees within a mile of such blocks. One-mile environs inspections also are made of all peach nurseries, and any infected trees found within a mile of a nursery or budwood block must be removed by or before May 15 in order to meet certification requirements of the uniform state quarantines.

In Arkansas, Oklahoma, and Texas, 42 nurseries, growing approximately 1,000,000 peach or other mosaic susceptible trees, were inspected and certified during the year. In addition, 26 proposed budwood sources were inspected and approved.

D. Methods Improvement

Present status of the program in each of the three states should be carefully studied before preparing work programs for the new year. In east Texas, for example, there has been considerable planting of plums for commercial production, and plums in most instances are symptomless carriers of peach mosaic. Therefore, since it is impractical to make an inspection of plum trees for peach mosaic, consideration should be given to making a careful study of the various areas in east Texas where plums are being grown commercially with a view to determining if the present inspection program can be justified. It may be that certain counties or portions of counties should be eliminated from the control program. Such elimination, of course, would preclude the production of nursery stock and also would prevent nurserymen from obtaining budwood in such designated areas. In areas planted predominately to peach, the orchardists should be informed of the necessity for eliminating presently existing plum orchards if it is their intention to continue to control or eliminate peach mosaic.

In areas of all states where the program is to be continued, particular attention should be given to the elimination of wild plum thickets, as is being done in certain areas affected by the phony disease. This is considered necessary because wild plums are carriers of the virus causing peach mosaic, as well as of phony peach virus. Active programs should be arranged with the growers to begin a fight against the wild plums by the use of herbicides or other methods that will eliminate plums from their orchards and nursery-producing areas. Priority for control programs should be given to those areas that comply with recommendations to destroy wild plum thickets.

E. Other

In most instances, cooperating state agencies furnish an equal number of inspectors; however, there are instances when they furnish more inspectors than the federal agencies. Usually inspectors furnished by the cooperating state agencies are regular full-time employees of that agency; however, in some cases, temporary inspectors are employed and these usually are school teachers who are available on a seasonal basis from year to year. This arrangement has worked very satisfactorily in several states, and it is recommended that more thought be given in the various areas to establishing a corps of temporary inspectors who will be available on a seasonal basis during each inspection season, not only for this program but for other programs as well. If it is not possible to develop a corps of temporary inspectors, then it is far better to rely on regular inspectors who can be assigned to the program each year, since at least one season is required before an inspector can become sufficiently experienced to make reliable inspections.

Particular emphasis should be placed on called meetings of growers to discuss progress and control of the disease and to keep before them at all times the objectives of the control program. Program aids and other information on the disease and the control program should be distributed to all growers, and each year a particular effort should be made to be sure that all new growers receive this information. As it becomes necessary, grower meetings should be called and colored slides should be shown illustrating the symptoms of the disease and methods of controlling it. Sufficient time should be taken, either in meetings or in individual contacts, to fully explain the disease and its seriousness to growers and nurserymen, and to keep before them the steps that should be followed to protect nursery stock and orchards from serious to total loss from infection. Such meetings or contacts should be made well in advance of initiating the program each year.

TABLE I. NURSERY INSPECTION - PEACH MOSAIC REGULATED AREAS

FISCAL YEAR 1957

| State | Number Counties Inspected | Number Nurseries Inspected | Number Nursery Trees Inspected | Environs Inspected | | | |
|----------|---------------------------------|----------------------------------|--------------------------------------|--------------------|----------|-----------|----------|
| | | | | Properties | | Trees | |
| | | | | Inspected | Infected | Inspected | Infected |
| Oklahoma | 4 | 3 | 56,800 | 733 | 2 | 2,307 | 5 |
| Texas | 5 | 15 | 318,675 | 167 | 0 | 8,622 | 0 |
| Totals | 9 | 18 | 375,475 | 900 | 2 | 10,929 | 5 |

TABLE 2. NURSERY INSPECTION - OUTSIDE PEACH MOSAIC REGULATED AREAS

FISCAL YEAR 1957

| State | Number Counties Inspected | Number Nurseries Inspected | Number Nursery Trees Inspected | Environs Inspected | | | |
|----------|---------------------------------|----------------------------------|--------------------------------------|--------------------|----------|-----------|----------|
| | | | | Properties | | Trees | |
| | | | | Inspected | Infected | Inspected | Infected |
| Arkansas | 3 | 13 | 569,125 | 233 | 0 | 9,303 | 0 |
| Oklahoma | 5 | 6 | 107,800 | 27 | 0 | 169 | 0 |
| Texas | 3 | 5 | 201,700 | 14 | 0 | 376 | 0 |
| Totals | 11 | 24 | 878,625 | 274 | 0 | 9,848 | 0 |

TABLE 3. BUDWOOD SOURCES AND ENVIRONS INSPECTION - PEACH MOSAIC REGULATED AREAS

FISCAL YEAR 1957

| STATE | Number of counties | Total number of Budwood Sources Inspected | Total Number of Budwood Trees | Number of Budwood Sources with Mosaic in Budwood Block | Number Mosaic Trees in Budwood Block | ENVIRONS INSPECTION | | | | | | Mosaic Trees Removed by May 15, 1957 | | |
|----------|--------------------|---|-------------------------------|--|--------------------------------------|------------------------|-----------------|------------------------|-----------------|------------------------|-----------------|--------------------------------------|------------------------|-----------------|
| | | | | | | Properties | | Trees | | Total Number Inspected | Number Infected | | Total Number Inspected | Number Infected |
| | | | | | | Total Number Inspected | Number Infected | Total Number Inspected | Number Infected | | | | | |
| | | | | | | | | | | | | | | |
| Arkansas | 3 | 10 | 293,802 | 0 | 0 | 197 | 0 | 51,883 | 0 | 0 | 0 | | | |
| Oklahoma | 4 | 2 | 14,580 | 0 | 0 | 765 | 2 | 2,530 | 5 | 5 | 5 | | | |
| Texas | 7 | 14 | 138,352 | 0 | 0 | 174 | 1 | 17,938 | 2 | 2 | 2 | | | |
| Totals | 14 | 26 | 446,734 | 0 | 0 | 1,136 | 3 | 72,351 | 7 | 7 | 7 | | | |

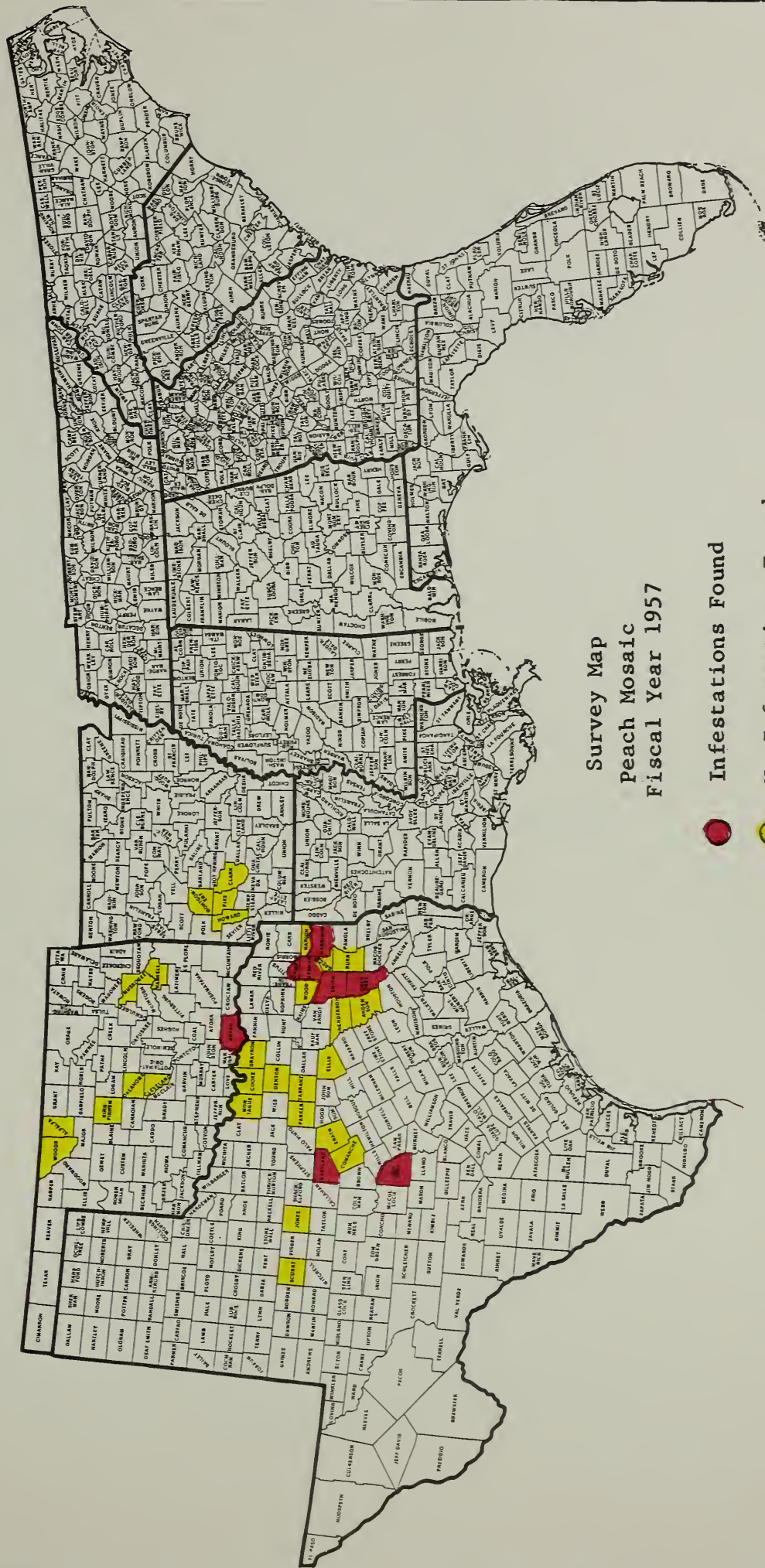
TABLE 4. PEACH MOSAIC INSPECTION SUMMARY

FISCAL YEAR 1957

| State | Number Properties | | Number Trees | | |
|----------|-------------------|----------|--------------|----------|---------|
| | Inspected | Diseased | Inspected | Diseased | Removed |
| Arkansas | 373 | 0 | 583,783 | 0 | 0 |
| Oklahoma | 589 | 2 | 11,116 | 5 | 5 |
| Texas | 748 | 82 | 361,908 | 287 | 287 |
| Totals | 1,710 | 84 | 956,807 | 292 | 292 |

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SOUTHERN REGION PLANT PEST CONTROL DIVISION



Survey Map
Peach Mosaic
Fiscal Year 1957

- Infestations Found
- No Infestations Found

PEACH MOSAIC



PROGRAM ANNUAL REPORT



**UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION
WESTERN REGION**

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION
WESTERN REGION

ANNUAL PROGRAM REPORT

PEACH MOSAIC

July 1, 1956 - June 30, 1957

Cooperating Agencies:

State Departments of Agriculture of the States
of California, Colorado, Utah, and New Mexico

October 30, 1957
Oakland, California

Jim R. Dutton
Regional Supervisor

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INTRODUCTORY

Statement of Problem

Peach mosaic is a contagious and destructive virus disease that attacks peach, nectarine, plum, prune, apricot, and almond. Natural spread of the disease is by a microscopic eriophyid mite, Eriophyes insidiosus. This mite vector inhabits the growth buds of host plants, lives there during the winter, and disperses in the spring. If the mite infested tree has peach mosaic, the virus is thus carried to other host trees. Artificial and long-distance spread may be caused by man through the movement of infected budwood and nursery stock.

Peach mosaic disease is most destructive in the freestone variety of peaches; however, in such varieties, inspection and control measures have produced excellent results. Clingstone varieties, white-fleshed varieties, and certain seedlings are more tolerant to the disease and, in some instances, infected trees exhibit few, if any, symptoms of peach mosaic. In orchards where these tolerant varieties grow, inspection is difficult, due to poor symptom expression of the disease, resulting in a lesser degree of control. Natural spread occurs during the entire growing season with the greater spread taking place prior to July. Peach mosaic disease spreads rapidly and takes a heavy toll in areas of concentrated peach plantings. Control is most effective when conducted on an area-wide basis.

In areas where freestone varieties of peaches are produced, when the peach mosaic virus and the vector are present in a concentration of susceptible peach trees, this disease, in the absence of control, is capable of destroying the peach industry of the area. Losses sustained under these conditions are not confined to the individual peach grower but extend to such associated industries as railroads, trucking companies, shock and basket manufacturers, quick freeze, fertilizer and insecticide companies. The economy of the locality, county, state, and nation which impinges upon the peach industry could be affected.

In the peach mosaic work area of southern California, western Colorado, San Juan County, New Mexico, and Moab County, Utah, based on the number of trees inspected and those found to be infected with peach mosaic and which were destroyed, the values and losses are indicated in the table that follows:

| <u>State</u> | 1956 | | 1957 | |
|--------------|-----------------------|--------------------|-----------------------|--------------------|
| | <u>Crop Value</u> | <u>Crop Loss</u> | <u>Crop Value</u> | <u>Crop Loss</u> |
| California | \$2,325,000.00 | \$6,384.00 | \$2,290,896.00 | \$6,102.00 |
| Colorado | 5,620,926.00 | 25,224.00 | 4,459,860.00 | 47,270.00 |
| New Mexico | 30,246.00 | 5,946.00 | 35,556.00 | 498.00 |
| Utah | 328,608.00 | 102.00 | 205,374.00 | 36.00 |
| | <u>\$8,304,780.00</u> | <u>\$37,656.00</u> | <u>\$6,991,686.00</u> | <u>\$53,906.00</u> |

Program Justification Statement

Peach mosaic disease has destroyed approximately 290,000 peach trees in the Western Region for an estimated loss to the peach industry of some \$5,500,000.00 since it was first recognized as a destructive virus disease. Federal participation, together with state, county, and grower cooperation, is believed to be necessary to reduce the incidence and retard the spread of peach mosaic disease. This cooperative effort will prevent disastrous losses to the peach industry, and aid in the enforcement of regulatory measures.

Program Objective

Long-term and immediate objectives of peach mosaic disease control are:

To provide leadership and coordination of effort in effecting economic control in commercial peach-growing areas.

To prevent the spread of peach mosaic disease by adequate nursery and budwood inspection, and quarantine enforcement.

To continue inspections of peach orchards in order that infected trees may be located and destroyed.

To inform the peach growers the importance of peach mosaic disease control and to encourage their cooperation in the control program.

PROGRAM HISTORICAL INFORMATION

The first record of peach mosaic disease in the Western Region was from the Palisade area of Mesa County, Colorado, in 1931, where seven affected trees were found in three adjoining orchards.

In the absence of effective control measures the disease spread rapidly. During the succeeding four years its area of distribution was extended to include 538 of the 600 properties (62 were unaffected). In 1935 the three originally infected orchards were from 96 to 100 percent infected.

For about 75 years it has been known that the control of virus diseases of the peach may be accomplished by the destruction of the diseased trees. As soon as it was known that peach mosaic is caused by a virus, the destruction of diseased trees was recommended as the only effective means of control. Control was first organized and put into operation during the late summer and fall of 1934.

California produces about one-half of the nation's peaches. Less than one-tenth of this production is in southern California where peach mosaic was found in 1933. As a result of effective control and regulatory measures, the disease has not spread out of this area to the main peach-producing areas of the State. Peach mosaic has been found in five counties in Utah in the southern and central part of the State. In Arizona and New Mexico the disease is found wherever peaches are grown but, because of the limited peach production and lack of interest, control is not attempted.

It has been learned over a period of years that the disease can be most effectively controlled when inspection is performed early in the summer and the diseased trees destroyed at the time they are found. By the application of this procedure on an area-wide basis and through adequate nursery and budwood inspection and quarantine enforcement, the outward spread of the disease apparently has been stopped.

PROGRAM ACTIVITY DURING FISCAL YEAR

Planning and Direction

State Pest Control Officials and area and district supervisors prepare work plans in keeping with available funds and personnel. These general plans can be modified to meet changed conditions by agreement among the cooperators. Field supervision of the work is the responsibility of the district supervisor who prepares weekly or monthly progress

reports on the activity. Over the years this procedure has proven effective, and all interested parties have been kept currently informed on the progress of the work. Considering the effectiveness of this method of operation, it is recommended that it be continued.

Technical Assistance

Close working relations are maintained with the research agencies in ARS, both Entomological and Pathological, located at Riverside, California. Since the discovery of the mite vector of peach mosaic in 1955, the entomology station has made some limited surveys to establish its distribution. It has been collected from southern California, limited areas in Colorado, Utah, Arizona, New Mexico, Arkansas, Texas, Mississippi, and Georgia. Host range and life history studies are in progress. Effective control of the vector is also being investigated.

Pathological studies include the various strains of the peach mosaic virus and testing new peach varieties to ascertain their susceptibility or tolerance to the several strains of the virus.

The close cooperation existing between research and control personnel is commendable.

Peach growers, county agents, and the industry are currently advised regarding any new developments pertaining to control as a result of research findings. This is accomplished through discussion at grower meetings, news releases, and the use of broadcasting facilities.

Survey

A survey for peach mosaic is conducted annually by the Bureau of Plant Pathology, California State Department of Agriculture, in connection with their survey for other stone fruit viruses in the main peach belt of the State. These surveys are in cooperation with the County Agricultural Commissioners, and are conducted north of the peach mosaic control area where observations are made of some three to four million trees. Results to date have been negative.

In Montezuma County, Colorado, a survey or reappraisal of the peach mosaic situation was made in 1957. The disease was first

reported from Montezuma County in 1936 when one mosaic tree was found. A control program was in operation from 1936 through 1940 when it was terminated due to lack of grower interest and cooperation. The 1957 survey was made during May and June. A total of 12,155 trees on 22 properties was inspected and 2,962 mosaic infected trees were found. This represents a disease incidence of 24 percent which is not unexpected considering that control recommendations have not been followed. Again this year there was no interest on the part of the growers for a control program. This area is isolated and ranching is of more interest to the inhabitants than is fruit growing.

Control

Objective

Peach mosaic, being a virus disease infection, is deep-seated in the host. From past experience, and presently available information, the necessity for control of this disease is a continuing one. Control measures have been effective when applied area-wide and at the proper time. A mite vector of peach mosaic, Eriophyes insidiosus, was reported by research workers in 1955. To date an effective control of the vector has not been found.

Annual control programs are conducted in Los Angeles, Riverside, San Bernardino, and San Diego Counties in California; Delta and Mesa Counties in Colorado; and in Grand County, Utah. Peach mosaic disease is found in the peach-growing areas of Arizona and New Mexico. Although peaches are not a major crop in either of these states, control programs were conducted during the years 1937 through 1941. These programs were finally discontinued due to the lack of grower cooperation and support. Insofar as peach-growing areas are concerned these two states are isolated from peach-growing areas in other states by mountains and wide expanses of desert. It is believed that the peach mosaic situation in Arizona and New Mexico does not present a serious hazard to the control programs conducted in other peach-growing states.

Techniques of Control

In the control of peach mosaic a close inspection is made of each peach tree. The inspector goes all the way

around each tree looking for peach mosaic symptoms. These include short internodes, delayed foliation and mottling crossing the veins in the leaf. The only known control of the disease is the destruction of all trees showing visible symptoms. This is done by delimbing the diseased tree at the time of inspection and then girdling the trunk at the ground level and placing ammonium sulfamate (ammate) in the girdle which kills the stump.

Considering the available information on virus diseases, it is believed that control procedures are adequate.

Accomplishments

For the fiscal year 1957, a total of 1,143,171 trees was inspected on 15,168 properties, and 8,664 peach mosaic infected trees were found on 807 properties. All mosaic trees found were removed except 2,962 which were found in Montezuma County, Colorado. The only inspection in New Mexico was on nursery and budwood certification which involved 926 trees on 35 properties. Ninety-three of the trees inspected on 19 of the properties surveyed were found infected.

In addition to the above data, the State of California Bureau of Plant Pathology, Department of Agriculture, in connection with their stone-fruit virus disease program made observations for peach mosaic on some 3,106,972 peach trees in 10 northern California counties during the fiscal year 1957.

Regulatory

Objective

The objective of this phase of the program is to prevent the further spread of peach mosaic disease through a program of nursery and budwood inspection and quarantine enforcement. This is accomplished through uniform State quarantines, except in the State of California which has an embargo type peach mosaic quarantine.

Nurseries and budwood sources in the peach mosaic regulated areas are inspected annually. Certificates may be issued on condition that all diseased trees are removed

from the environs of nurseries and budwood sources for a radius of one mile on or before May 15, provided that certificates may not be issued for one year following the finding of mosaic infection either in or immediately adjacent to a nursery block or budwood orchard. All budwood secured in or shipped from a regulated area must be cut under the supervision of an authorized State or Federal inspector and movement thereof must be covered by a special certificate.

At the present time there is no treatment available for use in rendering infected regulated articles eligible for movement or certification. During the fiscal year 1957, a total of 170 nurseries and dealers and two budwood sources were inspected in the peach mosaic regulated area in the Western Region. This cooperative regulatory work involved the inspection of 2,722 trees on 209 properties in the counties of Los Angeles, Riverside, San Bernardino, and San Diego in the State of California; Delta County, Colorado; and San Juan County, New Mexico. All nurseries inspected met the requirements for certification except three. Only two budwood sources were inspected and one of these, in San Juan County, New Mexico, was ineligible for certification.

Other

Cooperation

For the period July 1, 1956, through June 30, 1957, the combined federal, state, county, and grower man-days devoted to peach mosaic control totaled 2,822. States, counties, and growers furnished 1,625 man-days, or 58 percent. Federal man-days totaled 1,197, or 42 percent.

Funds

Total funds and contributed services amounted to \$142,071.00. States, counties, industry, and growers furnished \$98,796.00, or 70 percent. Federal funds expended amounted to \$43,275.00 or 30 percent of the cooperative total.

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
EXPENDITURES BY SOURCE AND ACTIVITY
PEACH MOSAIC

Region Western

Fiscal Year 1957

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|------------------------------|----------------------|----------------------|-----------|-----------|------------|---------------------|--------|------------|
| | Planning & Direction | Technical Assistance | Survey | Control | Regulatory | Methods Improvement | Other | Total |
| Source of Cash & Equivalent* | | | | | | | | |
| Plant Pest Control Division | 8,655.00 | 17,310.00 | 8,655.00 | 4,328.00 | 4,327.00 | | | 43,275.00 |
| Other | | | | | | | | |
| States | 4,481.00 | 8,561.00 | 7,083.00 | 5,055.00 | 2,126.00 | | | 27,306.00 |
| Counties | 3,240.00 | 6,480.00 | 4,516.00 | 1,760.00 | 1,620.00 | | | 17,616.00 |
| Industry | | | | | | | | |
| Subtotal-Other Organizations | 7,721.00 | 15,041.00 | 11,599.00 | 6,815.00 | 3,746.00 | | 375.00 | 375.00 |
| Total of PPC & Other | 16,376.00 | 32,351.00 | 20,254.00 | 11,143.00 | 8,073.00 | | 375.00 | 88,572.00 |
| Contr. Serv.** | | | | | | | | |
| States | | | | | | | | |
| Counties | | | | | 19,444.00 | | | 19,444.00 |
| Growers | | | | | 26,272.00 | | | 26,272.00 |
| Bu. Indian Affairs | | 74.00 | 50.00 | 7,474.00 | | | | 7,474.00 |
| Utah State Univ. | | | | 50.00 | | | | 174.00 |
| Total | | 74.00 | 50.00 | 7,524.00 | 45,716.00 | | 135.00 | 135.00 |
| Grand Total | 16,376.00 | 32,425.00 | 20,304.00 | 18,667.00 | 53,789.00 | | 510.00 | 142,071.00 |

* Limited to direct appropriation, allotments, services and supplies for which there is an actual cash expenditure.

**Limited to services incidental to other activities for which only an estimated value is available.

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Plant Pest Control Division
COOPERATIVE AID RECEIVED
PEACH MOSAIC

Region Western

Fiscal Year 1957

| State and Source of Aid | 1 | | 2 | | 3 | | 4 | 5 | 6 | 7 | 8 |
|----------------------------|------|--------------------------|-------------------|----------------------|--------|------------------------|-----------|-----------|---|---|---|
| | Cash | Cash and Equivalent Aid* | Personal Services | Equipment & Supplies | Space | Total of Cash & Equiv. | | | | | |
| States | | | 27,306.00 | | | 27,306.00 | 19,444.00 | 46,750.00 | | | |
| Counties | | | 17,616.00 | | | 17,616.00 | 26,272.00 | 43,888.00 | | | |
| Industry | | | | | 375.00 | 375.00 | | 375.00 | | | |
| Growers | | | | | | | 7,474.00 | 7,474.00 | | | |
| Bur. Indian Affairs | | | | | | | 174.00 | 174.00 | | | |
| Utah State University | | | | | | | 135.00 | 135.00 | | | |
| Total This Period | | | 44,922.00 | | 375.00 | 45,297.00 | 53,499.00 | 98,796.00 | | | |
| Grand Total | | | | | | | | | | | |

* Limited to direct appropriations, allotments from other sources, services and supplies for which there is an actual cash expenditure.

**Limited to services incidental to other activities for which only an estimated value is available.

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Plant Pest Control Division

INSPECTION RECORD
STATE SUMMARY

PEACH MOSAIC

Region Western

Fiscal Year 1957

| States | Counties | | Properties | | | Trees | | |
|---|------------------|--------------------|------------------------|------------------|-----------------|------------------|-----------------|----------------------------|
| | Number Inspected | No. Found Infected | No. Currently Infected | Number Inspected | Number Infected | Number Inspected | Number Infected | No. Infected Trees Removed |
| California* | 5 | 4 | 4 | 13,720 | 318 | 381,816 | 1,013 | 1,017 |
| Colorado** | 3 | 3 | 3 | 1,250 | 463 | 743,310 | 7,545 | 4,583 |
| New Mexico | 1 | 1 | 1 | 35 | 19 | 926 | 93 | 93 |
| Utah | 1 | 1 | 1 | 163 | 7 | 17,119 | 13 | 13 |
| Totals | 10 | 9 | 9 | 15,168 | 807 | 1,143,171 | 8,664 | 5,706 |
| Cumulative Totals From Beginning of Program | | | | | | | | |
| | 130 | 54 | 47 | 566,688 | 30,872 | 39,318,245 | 393,398 | 289,483 |

* 3,106,972 trees on 1,413 properties in 10 northern California counties inspected by California State Department of Agriculture in connection with their stone fruit tree virus disease inspection not included in these totals.

**2,962 mosaic trees found in Montezuma County, Colorado were not removed.

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Plant Pest Control Division

NURSERY INSPECTION - REGULATED AREAS
PEACH MOSAIC

Region Western

Fiscal Year 1957

| State | Number Counties Inspected | Number Nurseries Inspected | Number Nursery Trees Inspected | Enviroms Inspection | | |
|------------|---------------------------------|----------------------------------|--------------------------------------|-------------------------|----------|--------------------------------|
| | | | | Properties Inspected | Infected | Trees Inspected Infected |
| California | 4 | 168 | 19,663 | 168 | 2 | 504 2 |
| Colorado | 1 | 1 | 1,240 | 6 | 0 | 1,292 0 |
| New Mexico | 1 | 1 | 5,000 | 35 | 19 | 926 93 |
| Totals | 6 | 170 | 25,903 | 209 | 21 | 2,722 95 |

NURSERY INSPECTION - OUTSIDE REGULATED AREAS

| State | Number Counties Inspected | Number Nurseries Inspected | Number Nursery Trees Inspected | Enviroms Inspection | | |
|------------|---------------------------------|----------------------------------|--------------------------------------|-------------------------|----------|--------------------------------|
| | | | | Properties Inspected | Infected | Trees Inspected Infected |
| California | 1 | 1 | 922 | 8 | 0 | 32 0 |
| Totals | 1 | 1 | 922 | 8 | 0 | 32 0 |

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Plant Pest Control Division

BUDWOOD SOURCES AND ENVIRONS INSPECTIONS
REGULATED AREAS
PEACH MOSAIC

Fiscal Year 1957

Region Western

| STATE | Number of Counties | Total Number of Budwood Sources Inspected | Total Number of Budwood Trees | Number of Budwood Sources with Mosaic in Budwood Block | Number of Mosaic Trees in Budwood Block | Environ Inspection | | | | | | | |
|------------|--------------------|---|----------------------------------|---|---|------------------------------|--------------------|---------------------------|--------------------|------------------------------|--|--|--|
| | | | | | | Properties | | | | Trees | | | |
| | | | | | | Total Number Inspected | Number Infected | Total Number Inspected | Number Infected | Total Number Inspected | Number Infected | | |
| | | | | | | | | | | | | | |
| Colorado | 1 | 1 | 781 | 0 | 0 | 6 | 0 | 1,292 | 0 | 0 | Mosaic trees Removed by May 15, 1957 | | |
| New Mexico | 1 | 1 | 123 | 1 | 1 | 35 | 19 | 926 | 93 | 10 | | | |
| Totals | 2 | 2 | 904 | 1 | 1 | 41 | 19 | 2,218 | 93 | 10 | | | |

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Plant Pest Control Division
SUMMARY OF ASSOCIATED ACTIVITIES
PEACH MOSAIC

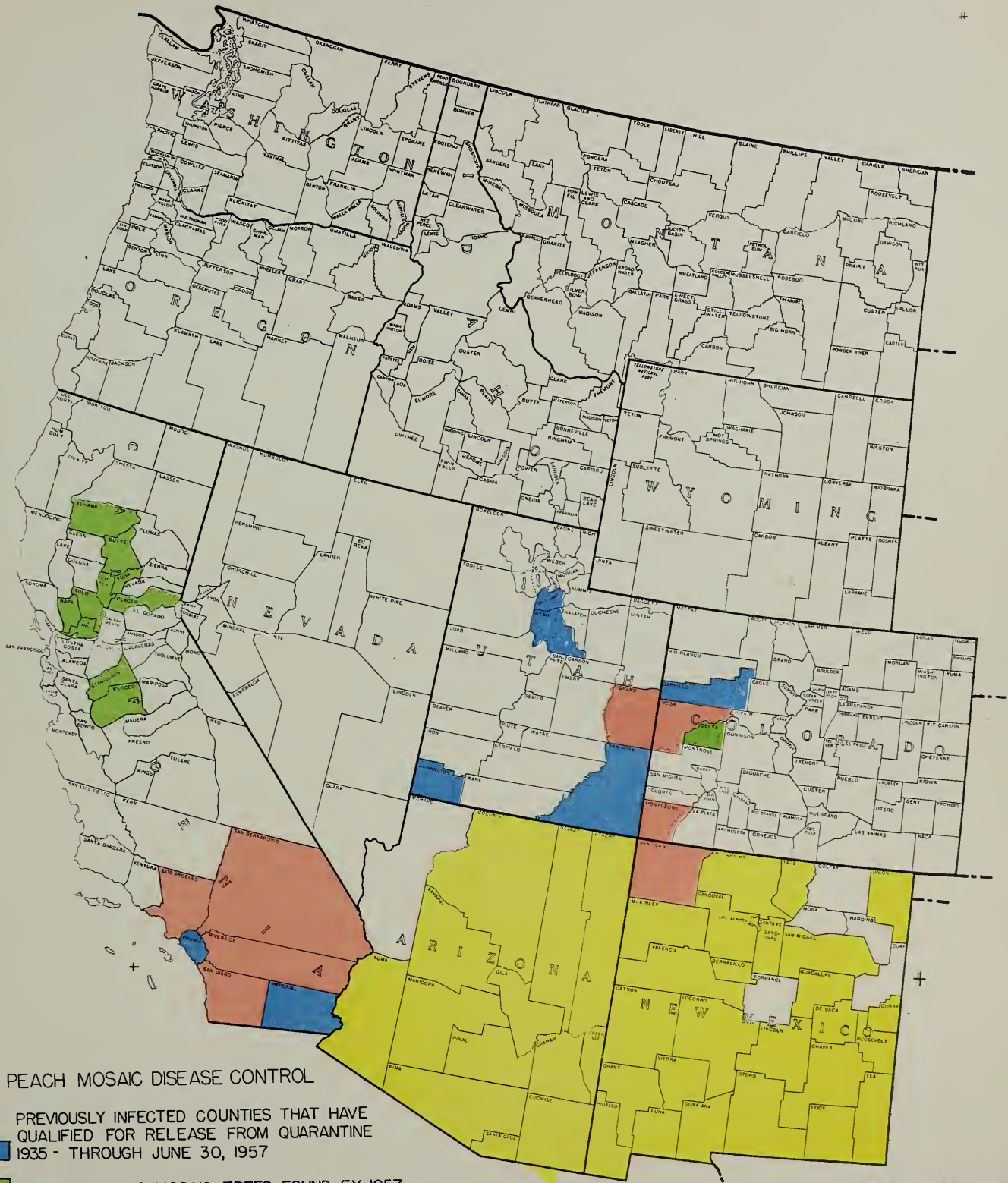
Region Western

Fiscal Year 1957

| Area | Public Meetings Attended | P r e s e n t a t i o n s | | | | | Feature & News Stories* | Extent These Aids Were Used** | | | Special Reports | |
|------------|--------------------------|---------------------------|--------|-------|-------|----|-------------------------|-------------------------------|-------|-------|-----------------|-----------------------|
| | | Talks | Slides | Films | Radio | TV | | Exhibits | Bul.* | Cir.* | | Infest Maps & Posters |
| Colorado | 11 | 5 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 100 | 0 | 200 |
| New Mexico | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Utah | 6 | 3 | 1 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 2 |
| Total | 18 | 9 | 3 | 1 | 0 | 0 | 4 | 1 | 0 | 100 | 0 | 202 |

* Written by Federal personnel for release direct or through cooperators.

**This should be a conservative estimate (accurate record for these items impractical).



PEACH MOSAIC DISEASE CONTROL

PREVIOUSLY INFECTED COUNTIES THAT HAVE
QUALIFIED FOR RELEASE FROM QUARANTINE
1935 - THROUGH JUNE 30, 1957



INSPECTED - NO MOSAIC TREES FOUND FY 1957

INSPECTED - MOSAIC TREES FOUND FY 1957

INFECTED - NO INSPECTION FY 1957

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION
WESTERN REGION

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION

SOUTHERN REGION

ANNUAL PROGRAM REPORT

PHONY PLACH

July 1, 1956 - June 30, 1957

Cooperating Agencies:

Regulatory, Control, Research, and Extension Agencies
of the Affected States

December 6, 1957
Gulfport, Mississippi

C. C. Fancher
Regional Supervisor

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I. INTRODUCTORY

A. Statement of Problem

Phony disease, caused by an insect-transmitted virus, for some years has been recognized as the most destructive disease of peaches in the United States; and it certainly has been a limiting factor in the commercial production of peaches in the more important areas of the Southeast, where it readily attains epidemic proportions in the absence of an organized grower-supported state and federal control program.

Control of phony is a complex problem for the following reasons: (1) incipient stages are difficult for an untrained person to detect and it is in this stage of infection that trees must be found and removed for best control results; (2) the causal virus appears to be endemic in the several species of wild plum which occur naturally throughout the southeast, and it is only by chemical test that its otherwise invisible presence can be demonstrated in these hosts; (3) even though at least four of the insect vectors, and certainly the most important ones, are known, there appears to be no immediate possibility of eliminating them because of the wide range of acceptable host plants other than peach.

B. Program Justification Statement

Control of phony disease is necessary in the important peach-growing southeastern states to protect an industry valued at approximately \$20,000,000 annually and to prevent entry of the disease into areas not presently known to be infested.

C. Program Objective

Since the important insect vectors, as well as the more important (if not the only) wild hosts of the phony disease, are now known, and it is believed that the long-term objective can be eradication of phony from at least the more important commercial and nursery areas in the southeast. It is recognized that such an accomplishment would take several years, but it is believed that with the interest now being shown in wild host destruction and with the apparent effectiveness of the newer insecticides on the insect vectors, it is not too much to be hoped for.

During the reporting year, considerable progress was made toward the destruction of wild plum thickets in several important areas, and a continuation of this phase of control operations will contribute greatly to the long-range objective. In addition, careful nursery and orchard inspections were continued, as has been done since the program was initiated in 1929, in an effort to avoid dissemination to areas not known to be infested and also to keep the disease in the commercial areas within the bounds of economic control.

D. Program Changes

There were no important changes during the year except in the destruction of wild plums in the peach-growing areas. This work, which was started in Georgia and South Carolina several years ago, was considerably stepped up in these states during the past year and was initiated in the small commercial area of north Louisiana.

E. Status of Infestation

The surveys made during the past several years seem to prove that there is a general phony infestation from the east half of Texas to western North Carolina, with the most severe areas of infestation being found in the states of Alabama, Georgia, Louisiana, Mississippi, and South Carolina. Several species of wild plums in this latitude also are heavily infected with phony disease. As these facts became evident, it was necessary to adjust work programs from the original plan of complete eradication over the entire infested area to one of eradication in the more important nursery and commercial orchard areas. Work of the past several years has been directed to this end, and it has been many years since there has been any report or any evidence of phony disease being disseminated by nursery stock. Infection in the more important commercial areas has steadily declined for the past several years under the combined efforts of the intensified inspection and infected tree removal program, together with the newer insecticides which are effective in controlling the insect vectors. In addition, greater emphasis has been placed on wild plum destruction; and this work, particularly during the past two years, has been considerably increased. It is believed at the present time that eradication of phony from the more important nursery and commercial orchard areas is well within the realm of possibility.

II. PROGRAM HISTORICAL INFORMATION

Phony was first observed in an orchard located near Marshallville, Georgia, about 1890, and for some time it was thought by a number of the peach growers that the dwarfed trees offered promise for propagation purposes since little or no pruning would be required. It was soon evident, however, that in addition to reducing the length of terminal twig growth, the disease greatly reduced the size and number of peaches on a tree so that after the trees had been affected with the disease for two or three years, and in some instances after they had exhibited symptoms for only one year, the peaches were too small to be of any economic value. The interest of the Department of Agriculture in controlling this disease dates back to July 15, 1915, when a peach grower in the Fort Valley area requested aid for fighting the disease which he termed "phony trees." Growers previously had referred to the dwarfed trees as "pony trees" because of their small size. This peach grower's request for aid

resulted in preliminary studies which led to the establishment in 1921 of the United States Peach Disease Field Laboratory at Fort Valley, Georgia, with Dr. Lee M. Hutchins in charge. Later announcement by Dr. Hutchins of the cause of phony with recommendations for its control resulted in the enactment of Federal Quarantine No. 69, effective June 1, 1929, and also the beginning of Federal participation in the control program which started on July 1, 1929. Although the Federal Quarantine was revoked on March 1, 1933, it was done so with the understanding that Federal cooperation would be continued on matters of survey, research, control, and eradication. Since that time, the regulatory phases of the program have been enforced by uniform state quarantines. Subsequent surveys revealed the presence of the disease in Alabama, Arkansas, Florida, Georgia, Illinois, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, Tennessee, and Texas. Isolated cases of trees infected with this disease also were found in Indiana, Pennsylvania, and Maryland.

III. PROGRAM ACTIVITY DURING FISCAL YEAR

A. Planning and Direction

Prior to beginning the active field work on the phony peach program, consultations were held with State officials and field personnel of the Division to discuss control results of past years and to formulate plans for the season. In these consultations and discussions, detailed plans as to funds, personnel, and equipment to be furnished by the cooperating State and Federal agencies were carefully worked out well in advance of the inspection program in order that no time would be lost.

B. Technical Assistance

Research entomologists and plant pathologists cooperated very closely with the control program and as new information was developed it was made available immediately to the control division. Extension entomologists, pathologists, and horticulturists cooperated by informing peach growers of new control developments and plans for each season. State entomologists and their technical staffs cooperated by furnishing an equitable portion of the inspection staff and by enforcing quarantine regulations relative to production of nursery stock.

Division personnel kept peach growers, county agents, and others interested in peach production currently informed of the progress and plans being made, particularly where changes were involved.

C. Survey

During the past year, surveys were restricted mostly to the regular control areas, and for this particular program they should be considered as a phase of control, as the control of the phony disease consists of orchard inspections and removal

of infected trees. The survey or inspection procedure on the phony peach program consists essentially of walking the peach orchards and determining trees actually infected with the disease on the basis of external symptoms. Most of the time, this method is completely satisfactory for commercial orchards where each block or orchard consists of a single variety. In orchards of mixed varieties or in outlying areas, for example the environs of commercial orchards or nurseries where the varieties are mixed or are seedlings, it is frequently necessary to resort to the chemical test which consists of treating thin cross sections of roots from suspected trees in a solution of methyl alcohol which has been acidulated by the addition of 15 percent hydrochloric acid. Within a few seconds, roots from a phony infected tree will show purple spots or flecks fairly evenly distributed over the surfaces of the root sections. If the roots are from a normal tree, or a tree not infected with phony, a uniform purplish discoloration will appear in a short time without spots or flecks.

D. Eradication or Control

In Alabama, Arkansas, Georgia, Mississippi, South Carolina, and Texas, 4,956,044 trees on 1,575 properties were inspected, and 26,285 trees on 585 properties were found to be infected with phony disease. All infected trees found were removed at the time of inspection or shortly thereafter.

Destruction of wild plums, which are native hosts of phony disease, was started in the orchard areas of Louisiana during the year and was continued in Georgia and South Carolina. This activity in Louisiana resulted in the chemical treatment of 35,300 square yards of wild plums within the environs of 8 orchards, all of which were in Lincoln Parish. In Georgia, where this phase of control began during the 1955 fiscal year, 225,445 square yards, or approximately 46 acres of plum thickets, have been treated in the environs of 94 orchards in 5 counties. In South Carolina, the fight against wild plums began in 1953 as a result of surveys which showed a high degree of infection with phony. From 1953 to 1957, a total of 254,225 square yards, or 52 acres of wild plum thickets, was destroyed within the half-mile environs of 112 orchards in 11 counties of that state.

E. Regulatory

In Alabama, Arkansas, Georgia, Mississippi, South Carolina, and Texas, 44 peach nursery planting sites were inspected in 14 counties, involving 11,372 peach trees on 235 properties which were within the half-mile environs. Only one phony infected tree was found within the environs of any proposed site, and it was promptly destroyed.

Wild plum trees were found within 300 yards of 20 proposed planting sites, but all such trees were promptly removed except in the case of 2 planting sites in the state of Texas.

In 17 counties of 6 states, 49 nurseries produced 1,351,400 nursery trees, all of which met the necessary certification requirements of the standard states phony peach quarantine.

F. Methods Improvement

In an effort to conserve manpower, and at the same time to more adequately inspect the commercial areas of peach production in the phony-infected sections of the southeast, studies have been made over a period of several years to devise ways and means of adequately covering the orchard areas at reduced costs, which at the same time would permit extending inspections to areas where it has not been possible thus far to make inspections. To this end, considerable use was made of jeeps for inspectors to ride in through the orchards. This method has proved to be very satisfactory and has saved an enormous amount of time in such areas as the Nashville-Highlands area of Arkansas, the large commercial areas of Georgia, and the smaller orchard areas of north Louisiana. As phony infection can actually be determined better from a short distance, inspection from jeeps or similar types of vehicles is just as effective as that made by inspectors walking through the orchards. Inspection from jeeps is particularly advantageous in orchards of young trees, particularly where phony infection is light. In the older orchards of central Georgia, where phony infection may be relatively high requiring frequent stops for marking the trees, this method tends to lose some of its efficiency; however, it is still possible to inspect orchards more rapidly and just as effectively by using jeeps.

G. Other

All phases of the phony peach control program in all of the affected states were carried on in very close cooperation with the state pest control agencies. These agencies furnished an equitable amount of the inspection personnel, and in some instances, part of the transportation. Where it was possible for the cooperating state agencies to assign their regular district inspectors to this program during the inspection period, the work moved more rapidly and smoothly because such an inspector was familiar with his district, was acquainted with practically all of the growers, was familiar with the location of the orchards, the number of trees involved, etc., and was able to discuss phony peach control with peach growers in connection with his other activities.

Some years ago, it was found that if the growers were currently informed of the progress of the control program, their cooperation with state and federal agencies was greatly enhanced. They were kept informed during the past year, as in former years, by the distribution of program aids and discussions of the work at meetings, which in many cases were held in connection with general pest control activities.

TABLE I. PHONY PEACH INSPECTION SUMMARY

FISCAL YEAR 1957

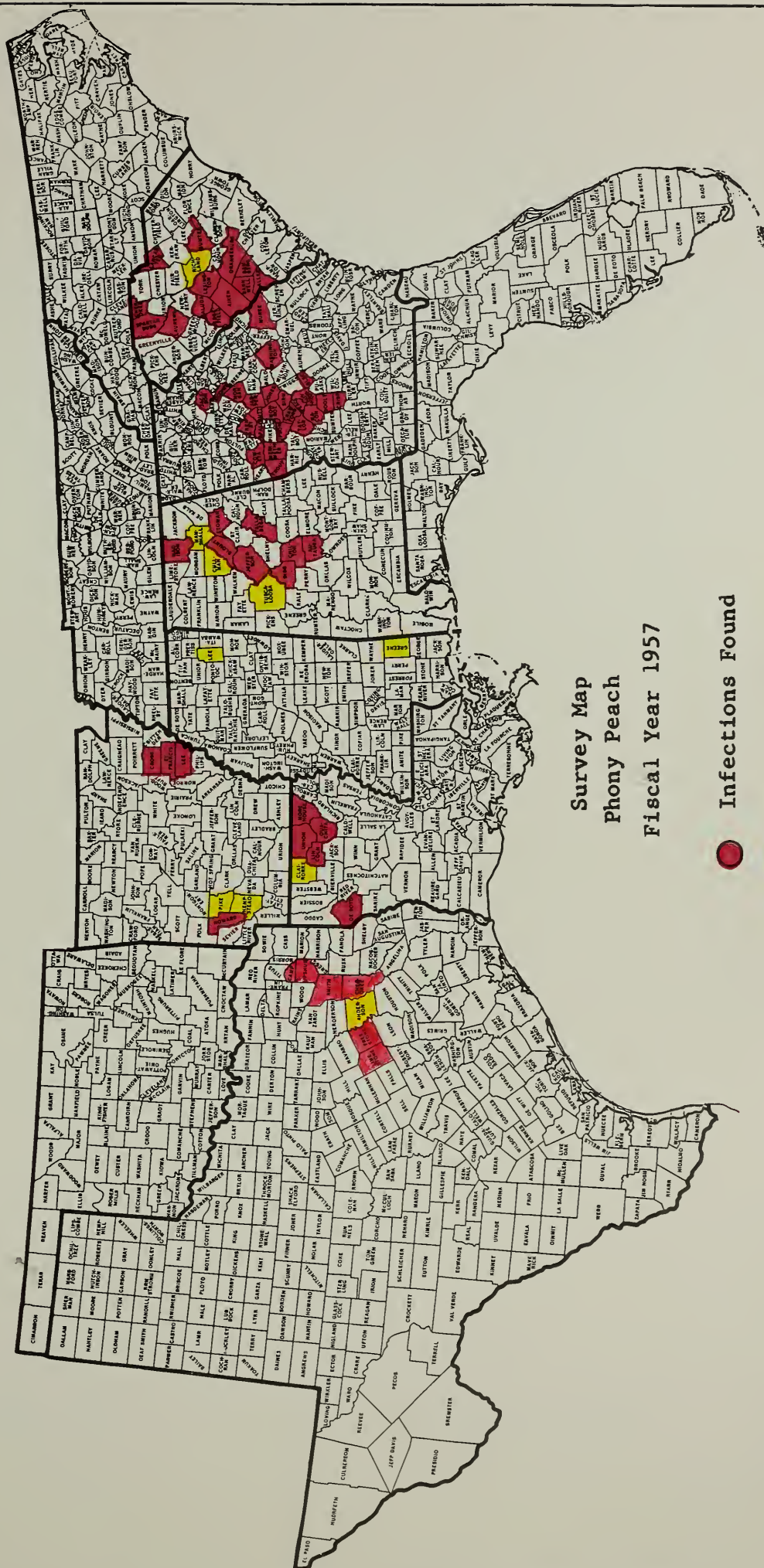
| State | Number Properties | | Number Trees | | |
|----------------|-------------------|----------|--------------|----------|---------|
| | Inspected | Diseased | Inspected | Diseased | Removed |
| Alabama | 559 | 278 | 511,060 | 3,345 | 3,345 |
| Arkansas | 207 | 27 | 743,153 | 82 | 82 |
| Georgia | 225 | 183 | 2,558,545 | 21,811 | 21,811 |
| Mississippi | 28 | 0 | 138 | 0 | 0 |
| South Carolina | 325 | 70 | 918,195 | 865 | 865 |
| Texas | 231 | 27 | 224,953 | 182 | 259 |
| Totals | 1,575 | 585 | 4,956,044 | 26,285 | 26,362 |

TABLE 2. PHONY PEACH NURSERY INSPECTIONS

FISCAL YEAR 1957

| State | Number Counties Inspected | Number Nurseries Inspected | Number Nursery Trees Inspected | Environs Inspected | | | |
|----------------|---------------------------------|----------------------------------|--------------------------------------|--------------------|----------|-----------|----------|
| | | | | Properties | | Trees | |
| | | | | Inspected | Infected | Inspected | Infected |
| Alabama | 6 | 18 | 549,900 | 133 | 0 | 1,031 | 0 |
| Arkansas | 1 | 3 | 149,325 | 36 | 0 | 433 | 0 |
| Georgia | 3 | 3 | 178,000 | 11 | 0 | 38 | 0 |
| Mississippi | 2 | 2 | 163 | 28 | 0 | 138 | 0 |
| South Carolina | 2 | 2 | 8,000 | 20 | 0 | 7,605 | 0 |
| Texas | 3 | 21 | 466,012 | 97 | 1 | 2,925 | 1 |
| Totals | 17 | 49 | 1,351,400 | 325 | 1 | 12,170 | 1 |

SOUTHERN REGION PLANT PEST CONTROL DIVISION



Survey Map
Phony Peach
Fiscal Year 1957

● Infections Found
● No Infections Found

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION
CENTRAL REGION

ANNUAL PROGRAM REPORT

PINK BOLLWORM

July 1, 1956 - June 30, 1957

Cooperating Agencies:

Plant Pest Control Division, Agricultural Research
Service, U. S. Department of Agriculture
In cooperation with
State, County, and Local Agencies

October 21, 1957
Minneapolis, Minn.

R. O. Bulger
Regional Supervisor

The following summary of the pink bollworm program in the Central Plant Pest Control Region is submitted in lieu of a complete annual report.

The pink bollworm is not a problem in this region to date. The cotton-growing counties in southeastern Missouri are not under Federal regulation, but inspections are made by the Missouri State Department of Agriculture for the presence of the pest. They maintain a road patrol for the purpose of inspecting mechanical pickers, picker crews, picking sacks, cars, trucks, and the like. In addition, the Division participated in a gin trash inspection during the period of November 4 to 14, 1956. A total of 348.5 bushels of gin trash was inspected in Dunklin, Mississippi, New Madrid, Pemiscot, Scott, and Stoddard Counties. No pink bollworms were found.

Table 1. - Summary of Associated Activities - Fiscal Year 1957

| State | Public : | Presentations | Feature : | **Extent These Aids Were Used: |
|-------|-----------|---|--------------------|--|
| | Meetings: | | & News : | :Circu--:Bulle--:Infest. Maps: Special |
| | Attended: | Talks:Slides:Films;Radio: TV :Stories*:Exhibits:lars* : | tings*:& Posters : | Reports |

FEDERAL

None

COOPERATORS

Missouri 6 6 0 0 0 0 4 1 0 100 0 0 1

Totals 6 6 0 0 0 0 4 1 0 100 0 0 1

*Written by Federal personnel for release direct or through cooperators.

**Conservative estimate.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION

MEXICO REGION FOR COOPERATIVE PROGRAMS
ANNUAL PROGRAM REPORT

PINK BOLLWORM

July 1, 1956 - June 30, 1957

Cooperating Agencies:

MEXICAN DEFENSA AGRICOLA

September 16, 1957
Monterrey, N. L., Mexico

W. K. Clore
Regional Supervisor

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION

MEXICO REGION FOR COOPERATIVE PROGRAMS
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Program Statistical Tables
Map Showing Program Status

INTRODUCTORY

Statement of Problem

The pink bollworm, one of the most serious insect pests of cotton, feeds on seed and lint in the developing cotton bolls, cutting and staining the fiber and reducing the weight and quality of seed. Severe infestations cause heavy loss in production.

The pink bollworm is widely distributed in the cotton-growing areas of eastern Mexico, comprising the states of Tamaulipas, Nuevo Leon, Coahuila, Durango and Chihuahua, contiguous to the cotton-growing areas in Texas and New Mexico and separated from the western area of Mexico by the Sierra Madre mountains. The insect is not known to be present in the western area of Mexico, comprising the states of Sinaloa, Sonora and Baja California adjacent to Arizona and California. It is essential to the cotton industry of both countries to suppress and control the infestation in the eastern area to economically control and prevent spread into the cotton-growing areas of the United States, and to prevent its entry into the western area since it would threaten the cotton industry of western United States and the northwestern area of Mexico.

The monetary value of the 1956 cotton crop in the United States was estimated to be almost three billion dollars involving 13,150,313 bales; in the adjacent Republic of Mexico almost 400 million dollars involving an estimated 1,800,000 bales of cotton. In Mexico a little more than half of the 1956 production was grown in the eastern infested area.

Program Justification

The story of the pink bollworm in other cotton-growing countries of the world indicates that, in the absence of control programs, losses average from 10 to 20 per cent and often much higher. The proximity of the western protective area of Mexico to California and Arizona, and the infested eastern area of Mexico being contiguous to the cotton-growing areas of Texas and New Mexico make it mutually obligatory for the United States and Mexico to work cooperatively in Mexico on a program designed to protect their cotton industries against the pink bollworm.

Program Objective

The purpose of the cooperative program with the Mexican Government is to prevent or retard further spread of the pest from the infested areas, suppress damage and prevent economic loss, permit the orderly and safe movement into trade channels of the Mexican crop produced in the regulated area without imposing unreasonable and unduly expensive restrictions, to keep free of infestation the western area of Mexico, thus protecting the cotton areas of Arizona and California, and to locate and eradicate any incipient infestation that might occur in the areas not infested.

Cooperatively with the Defensa Agricola of the Mexican Government during the current year, control procedures and regulations were encouraged and enforced in the regulated area. In the protective western area of Mexico, which is not known to be infested, gin trash inspections and field surveys were made with negative results and the inspection system, established to intercept potentially infested material that might be carried by any means of traffic, was maintained with plans formulated for strengthening the inspection program.

Status of Infestation

The pink bollworm infestation in Mexico extends from northwestern Chihuahua, adjacent to the Arizona-New Mexico line, southeast to the Gulf of Mexico. The infested area is composed of six combat zones with a total of 125 municipios in the five states of Chihuahua, Durango, Coahuila, Nuevo Leon and Tamaulipas. During the current year commercial damage was suffered in the municipio of Juarez in the Juarez Valley of Combat Zone No. 1. A rigid cultural control program was initiated and, as indicated by debris and bloom inspections, satisfactory control of the pest apparently has been accomplished. In Combat Zone 2 and 3 insecticidal control for the pink bollworm and other cotton insects was general. Damage from the pink bollworm was higher in Combat Zone No. 3, Laguna Region, than in any other zone in the regulated area.

PROGRAM HISTORICAL INFORMATION

The pink bollworm was introduced into the Laguna region of Mexico in cottonseed for planting brought from Egypt in 1911. By 1917 it had become well established in the states of Coahuila, Durango and Chihuahua in Mexico and was found in the State of Texas in the United States. Immediate steps were taken by both countries to combat the insect by means of quarantine, regulatory and cultural control measures. There was no additional spread in Mexico until in 1936 when it was discovered in the Lower Rio Grande Valley of Tamaulipas and of Texas, thus making connection across Nuevo Leon from Coahuila. Since that time there has been very little spread in Mexico and none below the San Fernando-Conchas river valley in the State of Tamaulipas. Inspectors of both countries, working on the control of the pink bollworm, had frequent discussions on the problem and concurred on the basis of local agreement until July 1, 1943, when a formal agreement of the secretaries of agriculture of both countries was drawn up and a cooperative program was set up which has continued to date. In 1953 a pink bollworm larva was found at Culiacan, Sinaloa from gin trash. As a consequence, quarantine measures were immediately imposed on the State of Sinaloa by Mexican authorities. A road station was established at Don to protect cotton-growing areas to the north of Sinaloa. The Defensa Agricola also established a road station near Mazatlan to prevent the entry into the western area of materials capable of carrying the pink bollworm from the infested eastern area of Mexico. Gin trash inspection and field surveys have revealed no further specimens. The road station at Don was closed after three years with no pink bollworm having been found by surveys in Sinaloa.

PROGRAM ACTIVITY DURING FISCAL YEAR

Planning and Direction

Supervising officials of the Defensa Agricola and the Plant Pest Control Division consult frequently and plan together the various activities of the program, directing all phases of the work through personnel at different working levels. Needs of the program are determined from observations, examination of the problem and evaluation of the situation from discussions with cooperating Mexican authorities so that the maximum control of the pest may be realized from monies available.

A shorter and more uniform planting period and improved cultural control practices are being emphasized in the infested zones. It has been planned and recommended that the State of Sinaloa in the Protective Zone of the Northwest be designated as a district with a district supervisor assigned to handle the anticipated increase in workload.

Technical Assistance

Personnel of the Plant Pest Control Division stay in close contact with Pink Bollworm Research and Agricultural Engineering Research of the Agricultural Research Service and inform cooperators of any new developments and accomplishments on the control of the pink bollworm. Information on the control of other cotton insects is furnished cooperators upon request.

Technical assistance was furnished by the Plant Pest Control Division to cooperators in the establishment of newly developed control and regulatory measures as well as systems used in survey and detection of the insect.

Survey

In the western area of Mexico where no pink bollworm infestation is known to exist, gin trash and bloom inspections were made to determine the presence or absence of the insect. In the eastern area in which all five states are known to be infested, gin trash, debris, bloom and green boll inspections were made to determine the density and severity of the infestation as well as to evaluate the effectiveness of control and regulatory measures and to determine the appropriate control measures to apply in each separate zone.

Lint cleaners are being installed in a number of gins throughout Mexico. Most of them are of a type not very satisfactory for pink bollworm inspection; however, it is expected that they may to some extent replace gin trash inspection. In the eastern area a limited amount of gin trash inspection was done in the states of Tamaulipas, Nuevo Leon and Chihuahua, while in the western area, comprising the states of Sinaloa, Sonora and Baja California, trash was inspected at gins in all of the principal cotton-growing districts. Refer to table in Appendix for summary of gin trash inspection.

Bloom inspection was made in all states and districts of the infested area and in the states of Sinaloa and Sonora of the noninfested western area. Refer to table in Appendix for summary of bloom inspection. Debris inspection to determine the effectiveness of the past season control and the probable carry-over in the infested areas was made in all combat zones. Refer to table for summary of debris inspection. Green boll inspection was made in the areas of long growing seasons where insecticides are used for pink bollworm control during the growing season and was made for the purpose of determining the time to apply and the effectiveness of control with insecticides.

Control

Control activities are confined principally to the eastern area of Mexico. Since 1952 the control program has been efficient enough to limit crop losses to a negligible amount with the exception of scattered fields over the area, principally in the Juarez Valley of Chihuahua and Laguna Region of Coahuila and Durango. A rigid cultural control program was put into effect in the Juarez Valley in the fall of 1956, requiring stalk destruction and deep plowing followed by a winter irrigation. Debris and Bloom inspections indicate a low carry-over of the insect and commercial damage is not expected in the 1957 crop. Insecticidal practices for control of the pink bollworm in La Laguna is a common practice. The pink bollworm carry-over reflected from field inspections indicated the necessity of the application of insecticides. Insecticides for pink bollworm control during the past growing season were used on more than 95 per cent of the area planted to cotton.

Each of the combat zones have different stalk destruction, plow-up and planting dates, depending on climatic conditions. The program is divided into the following practices:

- 1 Planting at the most opportune time and in the shortest time possible.
- 2 Protecting the crop with insecticides from insects that would delay early fruiting.
- 3 Early harvest and stalk destruction immediately behind the last picking, preferably by shredding.
- 4 Plowing the land to a depth of at least six inches.

It is well to mention that the maintenance of a host-free period is necessary in that portion of the quarantined area where the plant growth continues on account of the tropical climate. This also applies to okra, kenaf and other host plants which are covered in the Mexican quarantine.

Cultural control is mandatory under the Mexican quarantine in all of the six combat zones. Part of these combat zones have a fund in escrow in some form as a penalty for noncompliance. In 125 municipios in the 6 combat zones of the 5 infested states there was an estimated cotton acreage of 1,562,500 acres planted by an estimated 50,000 growers in the 1956-57 season.

Regulatory

Rules and regulations against the pink bollworm are carried out cooperatively by the Defensa Agricola and Plant Pest Control Division by authority of the Mexican Government as laid out in their quarantine. The Mexican Department of Agriculture is responsible for all legal action taken against individuals, firms, etc., for their failure to comply with the rules and regulations as set out in the quarantine. These regulations are for the purpose of accomplishing the following objectives: To hold the pink bollworm in suppression to prevent economic loss; to prevent movement of any susceptible materials that might be carrying the pink bollworm, from moving into a noninfested zone, and to reduce the infested area and eradicate where possible. In general, the regulations require all cotton products and all articles associated with its production, processing and handling to be so treated as to be free from pink bollworm before movement to a free zone. The quarantine since 1941 has more or less paralleled ours until June 20, 1957, when a newly written quarantine became effective. It is more strenuous than the previous one. (Refer to Mexican Department of Agriculture Rules and Regulations for the Campaign against the Cotton Pink Bollworm, effective June 20, 1957.) All processing plants are supervised and required to maintain sanitary conditions with proper segregation of products to prevent contamination. All gins are required to sterilize all cottonseed and burn all gin trash during the process of ginning. All baled lint must be wrapped in new bagging and compressed before movement from quarantined area. In the eastern area during the fiscal year 13,789, gin inspection visits were made to 238 operating gins which processed 1,030,368 bales of cotton. There were 2,082 official visits made to 21 oil mills and 697 visits to five compresses, four of which have double presses. Certification as to compliance with rules and regulations, as required by Foreign Quarantine, were issued on 124 gins, 11 oil mills and two double compresses for their products to move through American ports of entry. Refer to table in Appendix for summary of 1956-57 crop season report of regulated eastern area.

In connection with our cooperative work, 1,164 permits were issued for the movement of cotton and linter samples through the Brownsville Port of Entry. A blanket certificate was issued for the movement of almost one half million bales of cotton from the contiguous area through the Port of Entry.

In the western area the main objective is to prevent the entry of potentially pink bollworm infested material into the northwest coast of Mexico from eastern Mexico. This is being accomplished through inspection for hazardous materials at road stations, railway and air terminals, seaports and postoffices. Refer to tables in Appendix for summary of road station and railroad inspection activities.

It is recommended that Sinaloa be made into a district and a district supervisor be assigned to Mazatlan to work with Mexican authorities as technical advisor in fumigations, supervising gin trash inspection and field surveys, and that road stations be properly manned to handle more effectively the heavy volume of the various types of traffic and, particularly, to assure a thorough inspection of braceros and their baggage moving into Northwest Mexico.

Other

Cooperation was generally good throughout the year. The two cooperating agencies, Plant Pest Control Division and Defensa Agricola, shared in personnel, equipment and services in control, regulatory and survey work, the Defensa Agricola being responsible for all legal action taken relative to violations.

The extension service and experimental stations have been receiving financial aid from local patronatos and regional committees, making it possible for their assistance in cultural control through their contacts with farmers and industry thus developing greater cooperation in realizing cultural control practices. In outlying regions where the Defensa Agricola does not have representatives, presidents of different municipalities and private concerns assist our inspectors in accomplishing cultural control programs.

For funds spent, refer to Statistical Table in Appendix.

Associated activities and services are strengthened by annual conferences. In October of the past year the annual conference of Plant Pest Control Division and Mexican Department of Agriculture officials concerned with plant pest control of mutual interest was held in Brownsville, Texas. It was also attended by state agricultural officials and others interested in pink bollworm control. Mutual pink bollworm problems were discussed and information shared on progress of the work and research data. Talks were given on various phases of control and survey procedures.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION
PINK BOLLWORM

Region - Mexico

Fiscal Year 1957

GIN TRASH INSPECTION SUMMARY

| States | Number of Municipios | Number Bushels Trash Inspected | Number PBW Found |
|-----------------|-------------------------|--------------------------------------|------------------------|
| EASTERN AREA | | | |
| Tamaulipas | 7 | 918 | 266,455 |
| Nuevo Leon | 1 | 70 | 80,986 |
| Chihuahua | 6 | 238 | 114,156 |
| WESTERN AREA | | | |
| Sinaloa | 6 | 830 | 0 |
| Sonora | 6 | 2,493 | 0 |
| Baja California | 1 | 2,499 | 0 |
| Totals | 27 | 7,048 | 461,597 |

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION
PINK BOLLWORM

Region - Mexico

Fiscal Year 1957

BLOOM INSPECTION SUMMARY

| From January 1 through June 30, 1957 | | | | |
|--------------------------------------|----------------------|---------------------|-----------------------|-------------------------|
| State & District | No. fields Inspected | No. fields Infested | No. Blooms In-spected | No. Pink Bollworm Found |
| CHIHUAHUA) | | | | |
| Juarez) | 25 | 9 | 29,913 | 129 |
| Delicias)- | 65 | 49 | 34,841 | 197 |
| COAHUILA-DURANGO) | | | | |
| Laguna-Torreón) | 163 | 163 | 299,144 | 14,460 |
| TAMAULIPAS | | | | |
| Nuevo Laredo | 87 | 39 | 292,769 | 628 |
| Matamoros | 726 | 323 | 1,827,683 | 1,002 |
| SINALOA | * | 0 | 154,631 | 0 |
| SONORA | * | 0 | 14,000 | 0 |
| Totals | 1,066 | 583 | 2,652,981 | 16,416 |

* Number of fields not reported.

PINK BOLLWORM

DEBRIS INSPECTION 1956-57 CROP SUMMARY

| State & Combat Zone | Number Bolls Inspected | Number Pink Bollworm Found | |
|-----------------------|------------------------|----------------------------|------|
| | | Alive | Dead |
| CHIHUAHUA | | | |
| Juarez #1 | 555 | 0 | 6 |
| Delicias-Ojinaga #2 | 789 | 0 | 5 |
| DURANGO-COAHUILA | | | |
| Laguna Region #3 | 645 | 87 | 12 |
| COAHUILA | | | |
| Saltillo #4 | 381 | 40 | 10 |
| NUEVO LEON-TAMAULIPAS | | | |
| Monterrey #5 | 2,060 | 21 | 22 |
| TAMAULIPAS | | | |
| Matamoros #6 | 10,477 | 81 | 31 |
| Totals | 14,907 | 229 | 86 |

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION
PINK BOLLWORM

Region - Mexico

Fiscal Year 1957

1956-57 CROP SEASON REPORT
SUMMARY

| | |
|---|-----------|
| Visits to Processing Plants | 13,789 |
| Permits for Movement of Cotton and Cotton Products- | |
| Blanket permit for movement through American | |
| Port of Entry to the Port and Border Service | 1 |
| Permits for the movement of cotton and cotton | |
| products in Mexico are issued by the Mexican | |
| Department of Agriculture while the U.S. | |
| Department of Agriculture certifies all process- | |
| ing plants in contiguous area. | |
| Cotton Gins under Dealer-Carrier Permit (Mexican) | 264 |
| Oil Mills under Dealer-Carrier Permit (Mexican) | 21 |
| Compresses and Warehouses under Dealer-Carrier Permit | 9 |
| Vacuum Fumigation Plants | 0 |
| Fumigation Plants | 0 |
| Bales Cotton Ginned | 1,030,368 |
| Gins with Heaters to Treat Seed | 264 |
| Municipios under Quarantine | 125 |

UNITED STATES DEPARTMENT OF AGRICULTURE
 AGRICULTURAL RESEARCH SERVICE
 PLANT PEST CONTROL DIVISION
PINK BOLLWORM

Region - Mexico

Fiscal Year 1957

ROAD STATION INSPECTIONS

| Location | Vehicles Inspected | | | Total Vehicles Inspected | Number of Interceptions | | | Contaminated Trucks | |
|-------------------------|--------------------|--------|-------|--------------------------------|-------------------------|--------|-------|---------------------|------------------------|
| | Cars | Trucks | Buses | | Cars | Trucks | Buses | Cleaned | Cleaned & Fumigated |
| SONORA Benjamin Hill | 54,571 | 22,738 | 5,811 | 83,120 | 24* | 205* | 48* | - | - |
| San Luis | 2,058 | 3,387 | 1,388 | 6,833 | ** | ** | ** | - | - |
| SINALOA Mazatlan | | | | 17,193 | *** | *** | *** | 138 | 65 |

* Interceptions included 945 cotton-picking sacks, 7 seed cotton of varying amounts, 118 seed cotton pillows, 29 jute sacks with seed cotton contamination; also various miscellaneous items such as cottonseed, hulls, contaminated bale bagging, etc.

** Interceptions included 62 seed cotton quilts, 75 seed cotton pillows, 84 cotton-picking sacks, 18 seed cotton mattresses, and various confiscations of seed cotton.

*** 107 contaminated cotton-picking sacks confiscated and destroyed.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION
PINK BOLLWORM

Region - Mexico

Fiscal Year 1957

RAILROAD INSPECTIONS

| Location | Trains | | No. of Passengers Inspected* | No. of cars Inspected | Contaminated R.R. Cars | | | Express Packages Inspected |
|-----------------------------|-----------|-------|------------------------------------|-----------------------------|------------------------|---------|-----------|----------------------------------|
| | Passenger | Cargo | | | Loads Transferred | Cleaned | Fumigated | Cleaned & Fumigated |
| SONORA Benjamin Hill | 365 | 256 | 319,941 | 6,716 | 22 | = | = | 1,600 |
| BAJA CALIFORNIA Mexicali | - | - | - | 2,062 | - | 112 | 2 | - |
| | | | | | | | | 10,216 |

* Braceros included.

REMARKS: Benjamin Hill, Sonora interceptions of contaminated material included 1,391 cotton-picking sacks, 531 jute sacks, 223 pillows with seed cotton.

Mexicali, Baja California railway passenger interceptions of contaminated material included 63 cotton-picking sacks, 1 quilt and 1 pillow with seed cotton, and 31 jute sacks.



UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION

SOUTHERN REGION

ANNUAL PROGRAM REPORT

PINK BOLLWORM

July 1, 1956 - June 30, 1957

Cooperating Agencies:

Regulatory, Control, Research, and Extension Agencies of
the Affected States

December 6, 1957
Gulfport, Mississippi

C. C. Fancher
Regional Supervisor

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I. INTRODUCTORY

A. Statement of Problem

The pink bollworm is one of the most serious insects of cotton, and it is widely distributed over the cotton-growing areas of the world. The female moth lays from 100 to 200 eggs on cotton plants near the base of the squares or bolls. The larvae develop and feed on immature seed and lint in the developing bolls, and this results in stained and cut fibers, as well as in loss in weight of seed. In heavy infestations there may be complete loss of the cotton crop. This insect also attacks, to a limited extent, okra and a number of other members of the mallow family of plants. Pink bollworm in the United States occurs throughout Texas and Oklahoma, in the cotton producing areas of New Mexico, and, also, in parts of Arizona, Arkansas, and Louisiana.

The average annual value of the cotton crop in the United States is probably nearly 3 billion dollars; and it is estimated from the damage the insect has caused in countries where control programs are not in effect, that the pink bollworm is capable of causing an average loss of from 10 to 20 percent -- and in many instances much higher even than this.

B. Program Justification Statement

Even though infestation is general in Texas and Oklahoma, it is highly desirable to continue active suppressive programs in these states to prevent further buildups of infestation in western Louisiana and Arkansas, which in turn will, it is hoped, continue to prevent spread of this insect into the important cotton-growing areas of eastern Arkansas, Louisiana, Mississippi, and other states to the east. In the absence or failure of an adequate program, it has been estimated that the pink bollworm could cause losses as high as 300 million dollars annually in the cotton-growing area of the United States.

C. Program Objective

The long range objectives of the pink bollworm program are to eradicate the pest wherever practicable, to prevent or limit loss in areas where eradication procedures are not immediately feasible, and to prevent further spread through the movement of products or by moth flight. The immediate goals or objectives of the program are to strengthen eradication programs in Louisiana and Arkansas, as well as the suppressive programs in Texas and Oklahoma; to maintain the regulatory program at its present high degree of efficiency; and to continue to improve the inspection programs throughout the Region so that any incipient infestations can immediately be detected and eradicated.

D. Status of Infestation

Infestations were found in 14 counties in Arkansas during the year and in 6 of the Louisiana parishes. Oklahoma and Texas are considered to be generally infested.

II. PROGRAM HISTORICAL INFORMATION

The pink bollworm appears to have spread from India into Egypt and thence to Mexico about 1911. The first known infestation in the United States was found in 1917 at Heaxne, Texas, where it gained entrance in large shipments of infested cotton seed from Mexico. The control program began in 1918 as a part of the Federal Horticultural Board of the United States Department of Agriculture. At the present time, responsibility for control of this insect is assigned to the Plant Pest Control Division of Agricultural Research Service of the Department.

III. PROGRAM ACTIVITY DURING FISCAL YEAR

A. Planning and Direction

Plans for all phases of the program were formulated in conference between Division and State Pest Control personnel. These programs in the several infested states vary according to the individual needs for providing adequate control and prevention of spread to noninfested counties or sections of the state, or to states not known to be infested. In states where the pink bollworm has not been found, the primary aim of the program is to provide adequate inspection, particularly at interception points and at gins and other places where infestation may be detected, in order to prevent introduction of the insect to the states east of the presently known infested areas. Area supervisors are responsible for the immediate direction of all phases of pink bollworm control, eradication, or regulatory action in their respective areas. These supervisors assign personnel and equipment and maintain close contact with State officials in making such inspections as are considered necessary, particularly during the harvest season.

B. Technical Assistance

Federal and State experiment station workers continued their programs of testing new insecticides for control of pink bollworm, and the Extension Services in the various affected states cooperated in publicizing the various phases of the control program. Division and State inspectors provided assistance to farmers on insecticidal control in areas where this is considered necessary, furnished information to operators of gins and oil mills on the installation of special equipment to dispose of gin trash, and advised operators of fumigation plants on the construction of fumigation chambers and the use of fumigants in treating the regulated products.

C. Survey

Surveys are conducted throughout the growing and ginning season to provide data for control and regulatory procedures. Areas not known to be infested are surveyed annually in order that any incipient infestations may be promptly eradicated. Survey methods used include gin trash examinations; lint cleaner and gin stand examinations; debris inspections; dry boll, green boll, bloom inspections, and light traps. These methods are used at various times of the year when the particular method is most effective. Surveys were made in 9 of the 11 states of the Southern Region, and infestations were found in Arkansas, Louisiana, Oklahoma, and Texas. Most of the surveys in the noninfested states of Alabama, Georgia, Mississippi, South Carolina, and Tennessee were made by the use of gin trash machines, and 7,180 bushels of gin trash were examined in 130 counties in these states. No evidence of pink bollworm infestation was found.

D. Eradication or Control

In the generally infested states of Oklahoma and Texas, the primary objective of the program is to suppress the infestation to as low a level as possible in order to lessen danger of spread to lightly infested or noninfested areas by moth flight or escape of infested material. For the most part, the method used in planning suppressive control of pink bollworm in these two states is by a combination of mandatory and volunteer cultural practices. The objective of cultural control is to produce a uniform cotton crop in the shortest possible period, this to be followed by clean harvesting and thorough destruction of crop residue. The usual procedure is to destroy the stalks in the fields, by cutting or shredding and then plowing under, or by heavy grazing. In nearly all heavily infested fields, the stalks are both shredded and plowed under. Gin trash is treated by burning, by steam sterilization, or by processing it through approved fans or hammer mills.

In Arkansas, the aim is to restrict infestations to definitely delimited areas until such time as eradication can be accomplished. Various cultural control practices are followed in these localized areas; and an insecticidal control program using an approved insecticide in and around infested areas, as indicated by bloom inspection, was a special procedure used during the year. In Louisiana, much the same procedure was followed in eliminating pink bollworm from the six parishes where infestations were found during the reporting year.

E. Regulatory

The objective of the regulatory phase of the pink bollworm control program, of course, is to require such sanitary conditions at processing plants and such treatments of cotton products and

[illegible]

1. The first of these is the fact that the
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other articles likely to disseminate pink bollworm as will permit them to move to counties or states not known to be infested without danger of spreading the pink bollworm. Pink Bollworm Quarantine No. 52 provides for certification of cotton and its products, for okra, and for other articles when processed or treated under the observation of an inspector in accordance with methods selected by him from administratively authorized procedures known to be effective under the conditions applied.

At the end of the reporting period, 28 counties were under quarantine in Arkansas, 77 counties in Oklahoma, 254 counties in Texas and 18 parishes in Louisiana. In connection with regulatory activities, 45,193 visits were made to processing plants and 53,853 permits were issued covering movement of cotton and cotton products. In addition, 194 mechanical cotton pickers were fumigated. At the end of the reporting period, there were 2,138 cotton gins, 101 oil mills, 199 compresses and warehouses, and 146 other handlers and dealers operating under dealer-carrier permit.

Also in the regulated areas, there are 172 gins equipped with heaters for treating seed, one plant equipped to do vacuum fumigation, and 31 other fumigation plants.

F. Methods Improvement

No recommendations

G. Other

All phases of this program are carried out in cooperation with the State Plant Pest Control agencies, the cotton growers and ginners in the affected areas, and other concerns and individuals either directly or indirectly connected or concerned with the cotton industry.

PINK BOLLWORM

Fiscal Year 1957

| State | GIN TRASH INSPECTION | | LINT CLEANER INSPECTION | | | | | |
|-------------|----------------------|-----------------------------------|-------------------------|--------------------|-------------------|--------------------|-------------------|---------------|
| | No. Counties | No. Bushels Trash Inspected | No. PBW Found | No. Counties | | No. Inspections | | No. PBW Found |
| | | | | 7/1 to 12/31/56 | 1/1 to 6/30/57 | 7/1 to 12/31/56 | 1/1 to 6/30/57 | |
| Alabama | 26 | 610 | 0 | 3 | 0 | 8 | 0 | 0 |
| Arkansas | 50 | 10,519 | 330 | 8 | 0 | 72 | 0 | 0 |
| Georgia | 51 | 1,401 | 0 | 0 | 0 | 0 | 0 | 0 |
| Louisiana | 42 | 5,417 | 80 | 1 | 0 | 24 | 0 | 0 |
| Mississippi | 32 | 3,982 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oklahoma | 46 | 1,513 | 7,384 | 13 | 0 | 191 | 0 | 0 |
| Texas | 133 | 7,541 | 1234,387 | 86 | 27 | 3,778 | 54 | 9,043 |
| Totals | 380 | 30,983 | 1,242,181 | 111 | 27 | 4,073 | 54 | 9,043 |

PINK BOLLWORM
Road Station Interceptions
1956 - 57 Crop Season

| | Arkansas | Louisiana | Total |
|--------------------------------|-----------|-----------|-----------|
| Mechanical Pickers Passed | 41 | 102 | 143 |
| Mechanical Pickers Turned Back | 3 | 2 | 5 |
| Picker crews Inspected | 5,421 | 193 | 5,614 |
| Picking Sacks | 8,096 | 717 | 8,813 |
| Passenger Cars and Trucks | 1,716,950 | 379,275 | 2,096,225 |
| Cottonseed Trucks Inspected | 38 | 344 | 382 |
| Trucks Turned Back | 0 | 5 | 5 |
| Interceptions | 2,011 | 743 | 2,754 |
| Material Inspected: | | | |
| Bolls | 16,642 | 3,740 | 20,382 |
| Cottonseed | 71 | 39 | 110 |
| Seed Cotton | 1,272 | 1 | 1,273 |
| No. Live Pink Bollworms | 389 | 257 | 646 |
| Cargo and Produce Trucks | 0 | 5,485 | 5,485 |
| Okra Containers Inspected | 1,281 | 23,343 | 24,624 |

PINK BOLLWORM PROGRAM

SUMMARY

1956-57 Crop Season Report

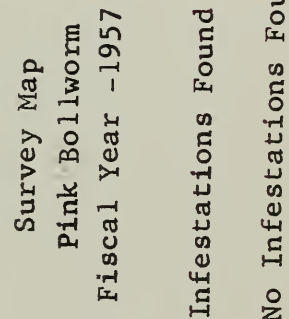
| | Arkansas | Louisiana | Oklahoma | Texas | Total |
|--|----------|-----------|----------|-----------|-----------|
| No. visits to processing plants | 2,262 | 3,136 | 5,717 | 29,078 | 40,193 |
| No. Permits for movement of cotton and cotton products | 3,704 | 16,127 | 2,251 | 31,807 | 53,889 |
| No. cotton gins under dealer-carrier permit | 68 | 98 | 277 | 1,695 | 2,138 |
| No. oil mills under dealer-carrier permit | 3 | 10 | 12 | 76 | 101 |
| No. compresses and warehouses under dealer-carrier permit | 23 | 25 | 20 | 139 | 207 |
| No. vacuum fumigation plants | 0 | 0 | 0 | 1 | 1 |
| No. fumigation plants | 0 | 0 | 2 | 29 | 31 |
| No. other handlers and dealers under dealer-carrier permit | 9 | 2 | 14 | 121 | 146 |
| No. bales cotton ginned | 64,336 | 103,800 | 259,902 | 3,563,861 | 3,991,899 |
| No. gins with heaters to treat seed | 68 | 98 | 0 | 6 | 172 |
| No. counties under quarantine | 28 | 18 | 77 | 254 | 377 |
| No. mechanical cotton pickers fumigated | 3 | 3 | 6 | 182 | 194 |

PINK BOLLWORM

Work Load and Statistical Data 1956-57 Crop Season

| State | No. of Counties | Estimated Cotton Acreage | Estimated No. of Growers | No. of Gins | | No. of Bales Ginned | No. of Oil Mills | | No. of Compresses | | Cotton Whse. | | All Other | |
|-----------|-----------------|--------------------------|--------------------------|-------------|--|---------------------|------------------|--|-------------------|--|--------------|--|-----------|--|
| | | | | Under DCP | | | Under DCP | | Under DCP | | Under DCP | | Under DCP | |
| Arkansas | 28 | 102,075 | 8,211 | 68 | | 64,336 | 3 | | 10 | | 13 | | 4 | |
| Louisiana | 18 | 155,667 | 10,939 | 98 | | 103,800 | 10 | | 14 | | 11 | | 2 | |
| Oklahoma | 77 | 810,713 | 46,710 | 277 | | 259,902 | 12 | | 16 | | 14 | | 16 | |
| Texas | 254 | 7,046,390 | 195,466 | 1,395 | | 3,563,861 | 76 | | 93 | | 46 | | 151 | |
| Total | 377 | 8,114,845 | 261,326 | 2,138 | | 3,991,899 | 101 | | 133 | | 84 | | 173 | |

SOUTHERN REGION



PINK BOLLWORM CONTROL

• • •

PROGRAM ANNUAL REPORT

• • •

**UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION
WESTERN REGION**

* _____ *

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION
WESTERN REGION

ANNUAL PROGRAM REPORT

PINK BOLLWORM CONTROL

July 1, 1956 - June 30, 1957

COOPERATING AGENCIES:

Arizona State Department of Agriculture
(Arizona Commission of Agriculture & Horticulture)
California State & County Departments of Agriculture
New Mexico State Department of Agriculture
Nevada State Department of Agriculture

October 30, 1957
Oakland, California

Jim R. Dutton
Regional Supervisor

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INTRODUCTORY

Statement of Problem

Little needs to be added to the well known story of the pink bollworm's ability to damage cotton. This insect is already well established in much of the cotton producing area of New Mexico, is present in most of the cotton area of Arizona, but is not known to have become established in California, although live larvae have been intercepted at California's borders more than once. Only a small amount of cotton is grown in Nevada and, to date, inspections have failed to reveal its presence in that state. Thus, the pink bollworm program in the Western Region resolves itself into a survey and regulatory problem in New Mexico and Arizona, and survey and prevention of spread into California and Nevada.

Program Justification Statement

The injury which the pink bollworm could, and does, inflict to the cotton crops of the southwest is so great there need be little discussion of the justification of a program designed to detect and suppress it. In the two states where it is established; namely, New Mexico and Arizona, the insect appears to be coming more adapted to local conditions. The intensity of the infestation is increasing, especially in New Mexico, and seems to be threatening the cotton producing section of eastern Arizona.

As aforementioned, California and Nevada are the only western cotton producing states in which the pink bollworm is not known to be established. California is particularly vulnerable because its cotton fields are not separated by natural barriers from those of Mexico. If northern Mexico's cotton area becomes infested, there is nothing to prevent the spread of the moths northward. The probability that this has already occurred is heightened by the fact that live pink bollworms have been taken from the picking bags of Mexican Nationals coming into California for the purpose of picking cotton.

The history of the pink bollworm in the United States is that only relatively light or incipient infestations have ever been eradicated. Any program, therefore, which will discover light infestations and secure prompt eradication is greatly to be desired.

Program Objective

In Arizona and New Mexico the objective is to prevent buildup of the moth population through cultural control methods and restrict spread through established state and federal quarantine regulations. In California and Nevada the objective of the program is to prevent introduction through quarantine action and to locate incipient infestations through various methods of survey.

Status of Infestation

In Arizona and New Mexico the intensity of infestation appears to be on the increase. It may be that this is a seasonal variation, or, on the other hand, the moth may be adapting itself to local weather conditions prior to becoming more of a pest than in previous years. As of June 30, 1957, no pink bollworm infestations had been found in California or Nevada.

PROGRAM HISTORICAL INFORMATION

Pink bollworm is native to India and was introduced into Mexico from Egypt in 1911. In 1917, it was found to have spread to Texas and then to adjacent states. In the Western Region infestations of this pest have persisted in Arizona and New Mexico for several years. It is believed some early incipient infestations were eradicated through cleanup of infested properties, but due to the movement of moths from heavily infested adjacent areas it was impossible to prevent establishment or to secure eradication of the later introductions. It is still the hope and expectation that should the pink bollworm be introduced into California and Nevada that the program now being pursued will be effective and result in early discovery and prompt eradication of any infestations established.

PROGRAM ACTIVITY DURING FISCAL YEAR

Planning and Direction

In the States of California and Nevada, where the program consists primarily of detection, all phases of the program were worked out with officials of the State Departments of Agriculture. The Plant Pest Control Division has on hand in California five modern gin trash machines. Arrangements were made for these to be operated by the California State Department of Agriculture. In the spring, a bloom inspection campaign was carried out in cooperation with state and county

agricultural organizations, and boll inspection was part of the regular field activities of the Departments of Agriculture. All of Nevada's cotton is ginned in California, and efforts are made to examine part of the gin trash from the Nevada cotton production while operating the gin trash machines in California. In addition, boll inspection is made in the field prior to harvest.

In the infested States of Arizona and New Mexico all phases of the work, including bloom and gin trash inspection, cultural control, commodity treatments and regulatory activities, were conducted in cooperation with the agricultural officials of the states involved.

Recommendations for coming year

In view of the manner in which this insect has spread from infested to non-infested areas, it is recommended that increased emphasis be placed upon the early discovery of possible new infestations in the non-infested states. An expanded bloom and gin inspection would be one of the best investments in preventing an incipient infestation from becoming widespread and beyond the hope of eradication.

Technical Assistance

Although much research is being carried on which is applicable to the Western Region generally, no new specific recommendations were requested of nor received from the Research Division during this period.

Survey

Accomplishments

In the infested states the annual bloom, boll and gin trash inspections were made with no new infested areas being reported. In the non-infested states the same type of inspection was likewise carried on. Here, too, no pink bollworm was discovered. A particularly intensive bloom inspection was made in Southern California near the areas where Mexican labor is housed. This was deemed advisable, since live pink bollworm larvae have been taken from the person and picking bags of Mexican Nationals entering the state for the purpose of picking cotton.

Recommendations for coming year

It is proposed to continue bloom, gin, and gin trash inspection to the extent that funds will permit. Particular emphasis will be placed upon lint cleaner inspection in gins operating in the southern part of California and Arizona, which are equipped with these devices.

Eradication or Control

Wherever the pink bollworm is established in the Western Region there appears to be no immediate hope of eradication. In fact, current efforts are not being directed along that line. Likewise, until new and better methods of control are developed, little progress can be expected. The best that can be hoped for is to prevent increased damage and further spread.

Regulatory

Federal quarantine regulations are enforced in Arizona and New Mexico. They parallel state quarantines and are designed to permit the orderly safe movement of cotton and cotton products within and out of the infested areas.

Regular inspections of the gins and processing plants are made by the Division's personnel. The purpose of these inspections is to insure correct handling of seed, lint, etc., and to enforce the sanitary requirements of quarantine regulations. In those areas where cultural control is practiced, Federal inspectors assist in this program.

Methods Improvement

No outstanding changes in procedure were made during the year under discussion. It is recognized that better methods of detecting new infestations are needed, and better control or eradication practices should be developed for use in the areas newly infested.

Other

Cooperation

In all states in the Western Region excellent cooperation was received from State and County Departments of Agriculture. In the infested states quarantine regu-

lations and control recommendations were satisfactorily carried out. In the non-infested states adequate assistance was received from the states in making surveys and enforcing proper quarantine safeguards.

Funds Expended

On all phases of the program the Division expended \$26,614; the states spent in direct appropriation \$11,908; and the states and counties spent on services limited to program activities, for which only an estimated value is available, the sum of \$71,185. The total amount expended on pink bollworm control in the Western Region was \$109,707.

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Plant Pest Control Division

EXPENDITURES BY SOURCE AND BY ACTIVITY
PINK BOLLWORM

Region Western

Fiscal Year 1957

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|------------------------------|----------------------|----------------------|--------|---------|------------|---------------------|-------|---------|
| Source of Cash & Equivalent* | Planning & Direction | Technical Assistance | Survey | Control | Regulatory | Methods Improvement | Other | Total |
| Plant Pest Control Division | 5,300 | | 10,000 | | 11,314 | | | 26,614 |
| Other Organizations (name) | | | | | | | | |
| States | 1,700 | | 8,708 | 300 | | | 1,200 | 11,908 |
| Subtotal-Other Organizations | 1,700 | | 8,708 | 300 | | | 1,200 | 11,908 |
| Total (of PPC & Other) | 7,000 | | 18,708 | 300 | 11,314 | | 1,200 | 38,522 |
| Contributed Services** | | | | | | | | |
| States | 9,450 | 2,200 | 600 | | 32,644 | | | 44,894 |
| Counties | 5,250 | | | | 21,041 | | | 26,291 |
| Total | 14,700 | 2,200 | 600 | | 53,685 | | | 71,185 |
| Grand Total | 21,700 | 2,200 | 19,308 | 300 | 64,999 | | 1,200 | 109,707 |

* Limited to direct appropriation, allotments from other sources, services and supplies for which there is an actual cash expenditure.

** Limited to services incidental to other activities for which only an estimated value is available.

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Plant Pest Control Division

COOPERATIVE AID RECEIVED
PINK BOLLWORM

Region Western

Fiscal Year 1957

| State and Source of Aid | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | |
|----------------------------|--------------------------|--|-------------------|--|----------------------|--|-------|--|------------------------|--|-------------------------------|--|--------------------|--|---------|--|
| | Cash and Equivalent Aid* | | Personal Services | | Equipment & Supplies | | Space | | Total of Cash & Equiv. | | Intangible Service Estimate** | | Source Grand Total | | Remarks | |
| | Cash | | | | | | | | | | | | | | | |
| Arizona | | | 2,458 | | | | | | 2,458 | | 24,400 | | 26,858 | | | |
| California (State) | 8,500 | | | | | | | | 8,500 | | 19,444 | | 27,944 | | | |
| California (Counties) | | | | | | | | | | | 26,291 | | 26,291 | | | |
| Nevada | 400 | | | | | | | | 400 | | 600 | | 1,000 | | | |
| New Mexico | 550 | | | | | | | | 550 | | 450 | | 1,000 | | | |
| Total This Period | 9,450 | | 2,458 | | | | | | 11,908 | | 71,185 | | 83,093 | | | |

* Limited to direct appropriation, allotments from other sources, services and supplies for which there is an actual cash expenditure.

** Limited to services incidental to other activities for which only an estimated value is available.

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Plant Pest Control Division

FIELD ACTIVITIES
PINK BOLLWORM

Region Western

Fiscal Year 1957

GREEN BOLL INSPECTION

| State | Number of Counties | Number of Bolls Inspected | Number of Pink Bollworms Found |
|------------|-----------------------|------------------------------|-----------------------------------|
| Arizona | 4 | 16,000 | 29 |
| California | 6 | 98,211 | 0 |
| Nevada | 2 | 2,231 | 0 |
| New Mexico | 1 | 200 | 200 |
| Totals | 13 | 116,642 | 229 |

DEBRIS INSPECTION

| State | Number of Counties | Number of Bolls Inspected | Number of Pink Bollworms Found |
|------------|-----------------------|------------------------------|-----------------------------------|
| Arizona | 0 | 0 | 0 |
| California | 0 | 0 | 0 |
| New Mexico | 1 | 5,987 | 430 |
| Totals | 1 | 5,987 | 430 |

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Plant Pest Control Division

FIELD ACTIVITIES
PINK BOLLWORM

Region Western

Fiscal Year 1957

BLOOM INSPECTION

| State | Blossoms Inspected | Properties Inspected | Acres Inspected | Number of Infested Blossoms |
|------------|--------------------|----------------------|-----------------|-----------------------------|
| Arizona | 0 | 0 | 0 | 0 |
| California | 454,421 | 308 | 16,968 | 0 |
| New Mexico | 42,688 | 0 | 0 | 169 |
| Nevada | 0 | 0 | 0 | 0 |

GIN TRASH INSPECTION

| State | Bushels Gin Trash Inspected | No. Pink Bollworms Found | No. Lint Cleaner Inspections | No. Pink Bollworms Found on Lint Cleaner |
|------------|--|--------------------------|------------------------------|--|
| Arizona | 6,086 | 213 | 245 | 7 |
| California | 25,555 | 0 | 0 | 0 |
| New Mexico | 424 | 2,259 | 2,994 | 0 |
| Nevada | No gin trash machine operated in Nevada. | | | |

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Plant Pest Control Division

INSPECTION SUMMARY
PINK BOLLWORM

Region Western Fiscal Year 1957

| States | GIN TRASH INSPECTION | | | LINT CLEANER INSPECTION | | | | | |
|------------|--------------------------------------|-----------------------------------|------------------|-------------------------|-------------------|--------------------|-------------------|--------------------|-------------------|
| | No. Counties or Municipalities | No. Bushels Trash Inspected | No. PBW Found | No. Cos. or Municip. | | No. Inspections | | No. PBW Found | |
| | | | | 7/1 to 12/31/56 | 1/1 to 6/30/57 | 7/1 to 12/31/56 | 1/1 to 6/30/57 | 7/1 to 12/31/56 | 1/1 to 6/30/57 |
| California | 8 | 25,555 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Arizona | 7 | 6,086 | 213 | 6 | 2 | 336 | 63 | 11 | 2 |
| New Mexico | 5 | 424 | 2,259 | 7 | 0 | 130 | 0 | 2,994 | 0 |
| Total | 20 | 32,065 | 2,472 | 13 | 2 | 466 | 63 | 3,005 | 2 |

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Plant Pest Control Division

SUMMARY OF ASSOCIATED ACTIVITIES
PINK BOLLWORM

Region Western

Fiscal Year 1957

| Area | Public Meetings | P r e s e n t a t i o n s | | | | | Feature & News Stories* | Extent These Aids Were Used** | | | Special Reports |
|------------|-----------------|---------------------------|--------|-------|-------|----|-------------------------|-------------------------------|-------|-------|-----------------|
| | | Talks | Slides | Films | Radio | TV | | Exhibits | Bul.* | Cir.* | |
| Arizona | 4 | 4 | | | | | | 4 | 2 | 20 | |
| California | 0 | 0 | | | | | | 0 | 0 | 0 | |
| Nevada | 0 | 0 | | | | | | 0 | 0 | 0 | |
| New Mexico | 2 | 0 | | | | | | 0 | 0 | 0 | |
| Total | 6 | 4 | | | | | | 4 | 2 | 20 | |

* Written by Federal personnel for release direct or through cooperators.

** This should be a conservative estimate (accurate record for these items impractical)

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION
CENTRAL REGION

ANNUAL PROGRAM REPORT
SOYBEAN CYST NEMATODE CONTROL
July 1, 1956 - June 30, 1957

Cooperating Agencies:

Plant Pest Control Division, Agricultural Research
Service, U. S. Department of Agriculture
In cooperation with
State, County, and Local Agencies

October 21, 1957
Minneapolis, Minn.

R. O. Bulger
Regional Supervisor

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I. INTRODUCTORY

A. Statement of Problem

Approximately $16\frac{1}{2}$ million acres, or 80 percent of the total soybean acreage, is grown within the boundaries of the Central Plant Pest Control Region. The soybean cyst nematode has been located on the fringe of the region in Pemiscot and New Madrid Counties, Missouri, and Fulton County, Kentucky.

This nematode, first found in North Carolina in 1954, has demonstrated that it can materially reduce yields and, in some fields, cause complete loss. Because of this threat to the soybean industry, surveys were made to locate the limits of the present known infestation, and to determine if the pest is prevalent in other soybean-producing areas.

Hearings have been held to ascertain the feasibility of establishing a Federal quarantine to assist in preventing the spread of this nematode.

At the close of the period covered by this report, plans have been completed for a region-wide survey in cooperation with the states. Every state in the region is participating to a degree consistent with soybean production.

To bring the tremendous task of conducting a survey covering $16\frac{1}{2}$ million acres within the limits of available manpower, certain criteria were established for sampling. First priority was given to fields with a record of several years of continuous soybean production. Next would be fields where short rotations were practiced. The early spring soil-sampling was to have been followed by a symptom survey in July, but heavy rains and ideal growing conditions did not permit symptoms to develop. This phase of the survey was delayed until later in the season.

In the initial stages of this program, the problem has been to determine the true extent of the soybean cyst nematode infestation. Once this has been determined, subsequent action can be planned to cope with this pest.

B. Program Justification Statement

The soybean is a major cash crop in this region. The threat of reduced yields from this pest, plus rising production costs, would make it impractical for farmers to continue production of the soybean. Since this pest is known only on the fringe of the area, every effort is needed to confine it to its present boundaries.

C. Program Objective

At the present time no practical control or eradication procedure is known for the soybean cyst nematode. Therefore, the long-term objective of the soybean cyst nematode program must be to locate every infested field in the region and to devise regulatory and sanitary practices which will prevent the spread of this pest to uninfested fields. The search for practical control methods that will eradicate or reduce known infestations must be continued.

When the first find of the soybean cyst nematode was reported within the region, we lacked all the necessary supplies to conduct a survey. Field personnel had only written reports to use as guides. Supplies were ordered, covering such items as sacks and laboratory and field equipment. Eight portable soil-washing machines were made available to establish field sub-laboratories. Two training schools were scheduled to train our State cooperators and our field personnel, and by the close of this period the detection survey was well under way. See table 1.

D. Changes in the Program

The original plan called for widespread symptom surveys during June. A late, wet spring upset the planting schedule. The survey was delayed until later in the calendar year because the usual symptoms did not develop even in fields known to be infested.

E. Status of Infestation

At the close of this reporting period, the current infestation is recorded from two states. In a single county in Kentucky one field of 50 acres has been positively determined as infested, and in Missouri three counties involving 36 fields with a total of 1,863 infested acres have been found. Surveys have just begun. Our best estimate at this time indicates that it will take at least three complete seasons of work to determine the full extent of the infestation in this region.

II. PROGRAM HISTORICAL INFORMATION

The soybean cyst nematode (Heterodera glycines Ichinohe) was first described by a Japanese scientist in 1952. It was first observed in the United States in August 1954 in the Castle Hayne area of North Carolina. In December of 1956, after it had been found in Lake County, Tennessee, it was also found in Missouri. A farmer who owned infested land in Tennessee, and who also farmed land in Missouri, provided a lead for sampling in Pemiscot County, Missouri. The first records of the soybean cyst nematode in this area were from samples collected by our supervisor on December 5, 1956. In May of 1957 an infested field was located in Fulton County, Kentucky. Subsequent surveys have shown that the infestation is quite general in the eastern half of Pemiscot

County, Missouri. Isolated infestations have been found in Stoddard and New Madrid Counties, Missouri. As of June 30, 1957, no additional counties have been found infested in Kentucky or in the remainder of the Region.

III. PROGRAM ACTIVITY DURING FISCAL YEAR

A. Planning and Direction

The Plant Pest Control Division has taken the lead in planning and directing the soybean cyst nematode program. Our area supervisors initiate cooperator conferences to discuss the program and plan the approach to the problem in each of the states. Included in such conferences are representatives from the regulatory organizations, the Experiment Station, and college staff members. The formula finally agreed upon will vary in each state; however, at the conclusion of the conference each group will have an important part in the over-all program. Resources involve such things as laboratory space, equipment, manpower, specialized service, travel funds, etc. A plan of work is drawn up for the program. The Plant Pest Control Division, in addition to furnishing certain items, retains the over-all direction of the program according to the jointly developed plan.

The over-all approach has been in operation less than a year. Changes may be necessary to keep current as the program develops.

B. Technical Assistance

The limited number of nematologists employed by the universities within the Region have offered their assistance to help train field personnel. They are engaged in various projects, including control trials and resistance work. They have collaborated in the preparation of informational releases to agricultural workers and have been most helpful in an advisory capacity for problems of a technical nature.

The Plant Pest Control Division acts as liaison between the technicians and the field. The Division has conducted schools to train field men in the technique of washing samples, recognizing cysts, selecting fields, and gathering soil samples. Plant Pest Control personnel direct the construction of field sub-laboratories, supervise sanitation, and organize the laboratory staff. It is also their responsibility to schedule field crews, balance work loads, and see that efficient operation is maintained.

C. Survey

The present survey is designed to detect the soybean cyst nematode wherever it might be within the Central Plant Pest Control Region.

Before taking soil samples or making observations, preliminary investigations are made to determine: (1) the oldest soybean area in the state, (2) the cropping practices in these areas, and (3) fields within the area where soybeans have been grown continuously. This practice helps limit the field work and, from a biological approach, shows our field men where the nematode is most apt to be.

Field crews gather aggregate samples from the fields. This is done by taking small portions of soil with a special tool and placing them in a special paper sack. A sample will weigh 8 to 10 pounds. Each sample is carefully marked and taken to a field laboratory for processing.

In the laboratory the field samples are processed in machines utilizing the "floatation process" for extracting cysts from the soil. All cysts are removed from the flotsam and forwarded to the Division Nematode Laboratory at Memphis for identification.

D. Eradication or Control

No practical control or eradication procedure has been developed.

E. Regulatory

Pending the promulgation of State and Federal quarantines, precautions are taken by field crews to prevent spreading this pest. Sanitary measures such as brushing foot wear and cleaning equipment before moving to another field have been mandatory. Workers have been encouraged to wear suitable clothing, such as trousers without cuffs, to reduce the hazard of spreading this pest by our field crews.

Growers have been encouraged to practice sanitation on a voluntary basis in moving machinery from infested fields, until the quarantine stipulates specific regulations and procedures to be followed.

After the initial confusion created by the announcement that this pest had been found, the farmers have taken a cooperative attitude. We believe this attitude will continue, helping to insure successful quarantine enforcement.

F. Methods Improvement

This is a relatively new pest. All procedures for survey, regulatory activity, and limited control are adaptations from the golden nematode program. As we work on this pest, it appears to be developing characteristics of its own. Our field employees are encouraged to explore every activity connected with this program for better methods and new techniques. Several important leads are being developed in sanitation and survey techniques.

G. Recommendations

1. Continue to improve the methods used on detection surveys and determine the outer limits of the known infestations.
2. Maintain rigid enforcement of the quarantine until research or new evidence indicated that the hazard of spread is negligible.
3. Encourage research studies along the following lines:
 - a. Practical methods of control.
 - b. Viability of cysts under field and bulk storage conditions.
4. Provide for additional personnel and equipment to carry out the various phases of the program.

Table 1. - Soybean Cyst Nematode Survey - Fiscal Year 1957

| State | Soil Survey | | Plant Inspection | | Infestations Confirmed | |
|-----------|-------------|--------|------------------|-------|------------------------|-------|
| | Properties | Acres | Properties | Acres | Properties | Acres |
| Illinois | 35 | 1,369 | - | - | - | - |
| Kentucky | 134 | 6,025 | - | - | 1 | 50 |
| Missouri | 1,708 | 64,954 | - | - | 36 | 1,863 |
| Ohio | 30 | 1,635 | - | - | - | - |
| Wisconsin | 37 | 370 | - | - | - | - |
| Totals | 1,944 | 74,353 | - | - | 37 | 1,913 |

Table 2. - Summary of Associated Activities - Fiscal Year 1957

| States | Public : | Presentations | | | | Feature : | | | | Extent These Aids Were Used** | | | | Special Reports |
|--------------------|--------------|---------------|----------|---------|---------|-----------|--------------|--------------|------------|-------------------------------|----------|-----------|--------|-----------------|
| | : Meetings : | Talks : | Slides : | Films : | Radio : | TV : | : & News : | : Stories* : | Exhibits : | Bulle- : | Circu- : | Infest. : | Maps : | |
| | : Attended : | : | : | : | : | : | : Stories* : | : | : | : | : | : | : | |
| <u>FEDERAL</u> | | | | | | | | | | | | | | |
| Ill. | None | | | | | | | | | | | | | |
| Ind. | None | | | | | | | | | | | | | |
| Iowa | None | | | | | | | | | | | | | |
| Ky. | 2 | 2 | 4 | - | 1 | - | - | - | - | 500 | - | - | - | - |
| Mich. | 2 | - | - | - | - | - | - | - | - | 84 | - | - | - | - |
| Minn. | None | | | | | | | | | | | | | |
| Mo. | 8 | 6 | - | 2 | - | - | - | - | - | 1,000 | - | - | - | 3 |
| N. Dak. | None | | | | | | | | | | | | | |
| Ohio | - | 6 | 12 | - | 1 | - | - | - | 3 | 2,000 | - | - | - | - |
| S. Dak. | None | | | | | | | | | | | | | |
| Wis. | - | - | - | - | - | - | - | - | - | - | 10 | - | - | - |
| Subtotals | 12 | 14 | 16 | 2 | 2 | 2 | - | - | 3 | 3,584 | 10 | - | - | 3 |
| <u>COOPERATORS</u> | | | | | | | | | | | | | | |
| Ill. | - | - | - | - | - | - | 1 | - | - | - | 500 | - | - | - |
| Ky. | 2 | 4 | - | - | 1 | - | - | - | - | - | - | - | - | - |
| Mich. | None | | | | | | | | | | | | | |
| Minn. | None | | | | | | | | | | | | | |
| Mo. | 7 | 7 | 4 | - | - | - | 6 | - | - | 300 | - | - | - | 1 |
| N. Dak. | None | | | | | | | | | | | | | |
| Ohio | None | | | | | | | | | | | | | |
| S. Dak. | None | | | | | | | | | | | | | |
| Wis. | - | - | - | - | - | - | 35 | - | - | - | - | - | - | - |
| Subtotals | 9 | 11 | 4 | - | 1 | - | 42 | - | - | 300 | 500 | - | - | 1 |
| Grand Totals | 21 | 25 | 20 | 2 | 3 | - | 42 | 3 | 3 | 3,884 | 510 | - | - | 4 |

*Written by Federal personnel for release direct or through cooperators.

**This is a conservative estimate.

Cooperative Aid Received - Fiscal Year 1957

| State | Cash and Equivalent Aid* | | | | Total of | | Intangible | | Source | | Remarks |
|-----------|--------------------------|-------------------|-----------|----------|---------------|-------|------------|---------|----------|-------|------------------------------------|
| | Cash | Personal Services | Equipment | Supplies | Cash & Equiv. | Space | Cash | Service | Grand | Total | |
| Illinois | 0 | \$ 2,097 | 0 | 0 | \$ 2,097 | 0 | | \$1,000 | \$ 3,097 | | |
| Indiana | 0 | 200 | 0 | 0 | 200 | 0 | | 0 | 200 | | |
| Kentucky | 0 | 0 | 0 | 0 | 150 | 150 | | 1,000 | 1,150 | | Program just begun January 1957 |
| Michigan | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | |
| Missouri | 0 | 11,250 | 540 | 245 | 12,035 | 2,200 | | 2,200 | 14,235 | | |
| Ohio | 0 | 500 | 75 | 50 | 625 | 1,500 | | 1,500 | 2,125 | | Program just begun June 1957 |
| Wisconsin | 0 | 100 | 0 | 0 | 100 | 400 | | 400 | 500 | | |
| Totals | 0 | 14,147 | 615 | 445 | 15,207 | 6,100 | | | 21,307 | | |

No work or funds in Michigan, Minnesota, Nebraska, North Dakota, or South Dakota.

*Limited to direct appropriation, allotments from other sources, services and supplies for which there is an actual cash expenditure.

**Limited to services incidental to other activities, for which only an estimated value is available.

Expenditure by Source and by Activity - Fiscal Year 1957

| State | Direction | Planning & Technical Assistance | Survey | Control | Regulatory | Methods Improvement | Other | Total |
|-------|-----------|---------------------------------|--------|---------|------------|---------------------|-------|-------|
|-------|-----------|---------------------------------|--------|---------|------------|---------------------|-------|-------|

CASH & EQUIVALENT*

| | | | | | | | | |
|-----------------------------|------------|------------|-------------|---|---|----------|-----------|-------------|
| Plant Pest Control Division | \$ 800.00 | \$ - | \$ 6,000.00 | - | - | - | - | \$ 6,800.00 |
| Other Organizations: | | | | | | | | |
| ILL. | 1,000.00 | - | 1,097.00 | - | - | - | - | 2,097.00 |
| Ind. | 200.00 | - | - | - | - | - | - | 200.00 |
| Ky. | - | - | - | - | - | - | - | 150.00 |
| Mo. | 750.00 | 840.00 | 10,000.00 | - | - | 200.00 | 245.00 | 12,035.00 |
| Ohio | 300.00 | 200.00 | - | - | - | - | 125.00 | 625.00 |
| Wis. | 100.00 | - | - | - | - | - | - | 100.00 |
| Subtotals | \$2,350.00 | \$1,040.00 | \$11,097.00 | - | - | \$200.00 | \$ 520.00 | \$15,207.00 |

CONTRIBUTED SERVICES**

| | | | | | | | | |
|--------------|------------|-------------|-------------|---|---|----------|------------|-------------|
| ILL. | - | \$ 1,000.00 | - | - | - | - | - | \$ 1,000.00 |
| Ky. | - | - | - | - | - | - | 1,000.00 | 1,000.00 |
| Mo. | 200.00 | 700.00 | 1,100.00 | - | - | - | 200.00 | 2,200.00 |
| Ohio | 500.00 | 500.00 | 500.00 | - | - | - | - | 1,500.00 |
| Wis. | - | 400.00 | - | - | - | - | - | 400.00 |
| Subtotals | \$ 700.00 | \$ 2,600.00 | \$ 1,600.00 | - | - | - | \$1,200.00 | \$ 6,100.00 |
| GRAND TOTALS | \$3,850.00 | \$3,640.00 | \$18,697.00 | - | - | \$200.00 | \$1,720.00 | \$28,107.00 |

*Limited to direct appropriation, allotments from other sources, services and supplies for which there is an actual cash expenditure.

**Limited to services incidental to other activities, for which only an estimated value is available.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION

SOUTHERN REGION

ANNUAL PROGRAM REPORT

SOYBEAN CYST NEMATODE

July 1, 1956 - June 30, 1957

Cooperating Agencies:

Regulatory, Control, Research, and Extension Agencies of
the Affected States

December 6, 1957
Gulfport, Mississippi

C. C. Fancher
Regional Supervisor

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I. INTRODUCTORY

A. Statement of Problem

The soybean cyst nematode (Heterodera glycines, Ichinohe) was discovered for the first time in the United States in Castle Hayne, New Hanover County, North Carolina, in August 1954. Since that date, in the Southern Region, it has been found in the States of Arkansas, and Tennessee. It may be some time before the extent of the present distribution of this pest is fully known. Available information and observations indicate that the uncontrolled presence of this pest may constitute a serious threat to the Nation's soybean industry. The program currently in operation involves survey and enforcement of quarantine regulations to prevent further spread. Preliminary research indicates that a 3- to 5-year crop-rotation plan may stop a buildup of this pest in soybean fields. It also has been found that certain chemicals will greatly reduce populations of this pest. This last-named method of control at the present time, however, is very expensive.

B. Program Justification Statement

Because of the potential seriousness of this new pest, it is imperative that infestations existing in the Region be found just as soon as possible. To achieve this aim, the Federal Government, in cooperation with the states known to be infested, has survey teams in most of the important soybean-growing areas, and a limited survey is under way in other states. A laboratory has been established at Memphis, Tennessee for identification of specimens in order to determine infestation status. During the early part of 1957, hearings were conducted preparatory to the establishment of Federal quarantines for soybean cyst nematode. The initial hearings involved the infested areas of North Carolina and Tennessee. The purpose of the Federal regulation will be to prevent spread of this pest to other soybean-producing states not presently known to be infested. Paralleling state quarantines undoubtedly will be invoked in the respective states to prevent spread from one area to another within the state boundary. This regulatory procedure will require increased attention to sanitary practices in the harvesting and marketing of crops within the infested areas.

C. Program Objective

The long-term objective is to locate and eradicate all infestations of this pest in the Southern Region. The immediate goal is twofold: (1) to extend the surveys in the counties where infestations have already been found and in surrounding counties, and (2) to initiate eradication efforts through the application of a combination attack by means of fallowing, use of soil fumigants, crop rotation, etc., as recommended by research pathologists.

Also, our immediate concern is to learn through research as much as possible about the host range, life cycle, means of distribution, and other data concerning the organism.

D. Changes from Work Plan

No changes were made from the initial work plan.

E. Status of Infestation

At the end of the fiscal year, infestations were known to exist in New Hanover and Pender Counties in North Carolina; in Lake, Dyer, Obion, and Lauderdale Counties in Tennessee; and in Crittenden and Mississippi Counties in Arkansas.

A considerable amount of survey has been done outside the areas of infestation and in other important soybean-producing states, all with negative results.

II. PROGRAM HISTORICAL INFORMATION

The soybean cyst nematode was first found in the United States in August 1954, by a farmer in New Hanover County, North Carolina, who reported serious injury to his soybeans. Later surveys exposed infestations on 1,470 acres in New Hanover County and on 320 acres in adjoining Pender County. It was thought at first that this possibly was an isolated infestation, but in November 1956 the pest was discovered in Lake County, Tennessee, by a plant pathologist of the Tennessee Experiment Station. In February 1957, a 20-acre field in Mississippi County, Arkansas, was found infested. Before finding the nematode in North Carolina, the only other infestations known were in Japan, where it was reported in 1915. Most of the research information concerning this pest is available in papers by Ichinohe and other Japanese workers. The only research work performed to date in the United States was in North Carolina in 1955 and 1956.

III. PROGRAM ACTIVITY DURING FISCAL YEAR

A. Planning and Direction

The soybean cyst nematode program was planned in cooperation with pathologists, extension workers, and personnel of the various State Departments of Agriculture involved. Division supervisory employees assisted in the formulation of the details relative to personnel and operations, and were responsible for applying plans in their respective areas. A continuation of the program as initiated during the present fiscal year is recommended for the coming year. Greater emphasis will be placed on the control aspects of the work, as well as for the enforcement of the quarantines that will be made effective at the beginning of the fiscal year 1958.

During the coming year, it is hoped that adequate surveys can be made to determine the full extent of the infestations throughout the Region and to actually delimit or pinpoint all infestations within the various areas.

B. Technical Assistance

Technical assistance was provided by the Plant Pest Control Division and the State Plant Pest Control workers in familiarizing farmers and other interested agricultural groups with the seriousness of this pest.

C. Surveys

Limited surveys were made in the states of Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas. Soil washing machines were made available for these named states. Insofar as possible, except in the areas where the soybean cyst was known to exist, the survey was accomplished concurrently with surveys for other pests with which the Region is concerned. Suspicious samples collected were forwarded to the Division laboratory which was established in Memphis, Tennessee. However, suspicious samples collected in new areas were initially sent to Washington for identification.

The field sampling technique included both soil and root sampling. The first-named method was employed during the fall, winter, and early spring months. The second procedure was used after field checks showed that cysts were present on the soybean plants.

The table given below reflects the survey accomplishments for the fiscal year 1957.

| <u>States</u> | <u>No. of Counties Surveyed</u> | <u>No. of Props. Surveyed</u> | <u>No. Infested</u> | |
|----------------|-------------------------------------|-----------------------------------|---------------------|--------------|
| | | | <u>Fields</u> | <u>Acres</u> |
| Alabama | 2 | 92 | 0 | 0 |
| Arkansas | 6 | 489 | 15 | 343 |
| Florida | - | - | - | - |
| Georgia | 29 | 118 | 0 | 0 |
| Louisiana | 11 | 86 | 0 | 0 |
| Mississippi | 30 | 323 | 0 | 0 |
| North Carolina | 23 | 5036 | 15 | 451 |
| Oklahoma | 7 | 9 | 0 | 0 |
| Tennessee | 10 | 523 | 32 | 2724 |
| Totals | 118 | 6676 | 62 | 3518 |

D. Eradication or Control

The immediate objective is control and eventual eradication of the pest under discussion. Owners of infested fields were urged to follow a plan of rotation so that non-host crops could be grown in an infested field for several years. Present information indicates that, while some of the larvae in the cyst may remain viable for several years, the major portion of them usually disappear in a year. Cultural practices were given consideration as they may influence the rate of mortality. Under the Methods and Development Section, tests have been initiated on field plots to determine the efficiency of chemical control.

E. Regulatory

There was no quarantine in effect during the fiscal year 1957.

F. Methods Improvement

Methods improvement was vital to this new program, since all facets of this work were contingent upon ways and means of finding, controlling, and eradicating this pest in the Southern Region. As has been indicated elsewhere in this report, most of the work performed during this fiscal year was on survey and included the application of techniques adopted from other nematode projects. Suggestions for the coming year will be an expansion of all phases of the program, including surveys, control, and regulatory.

G. Other

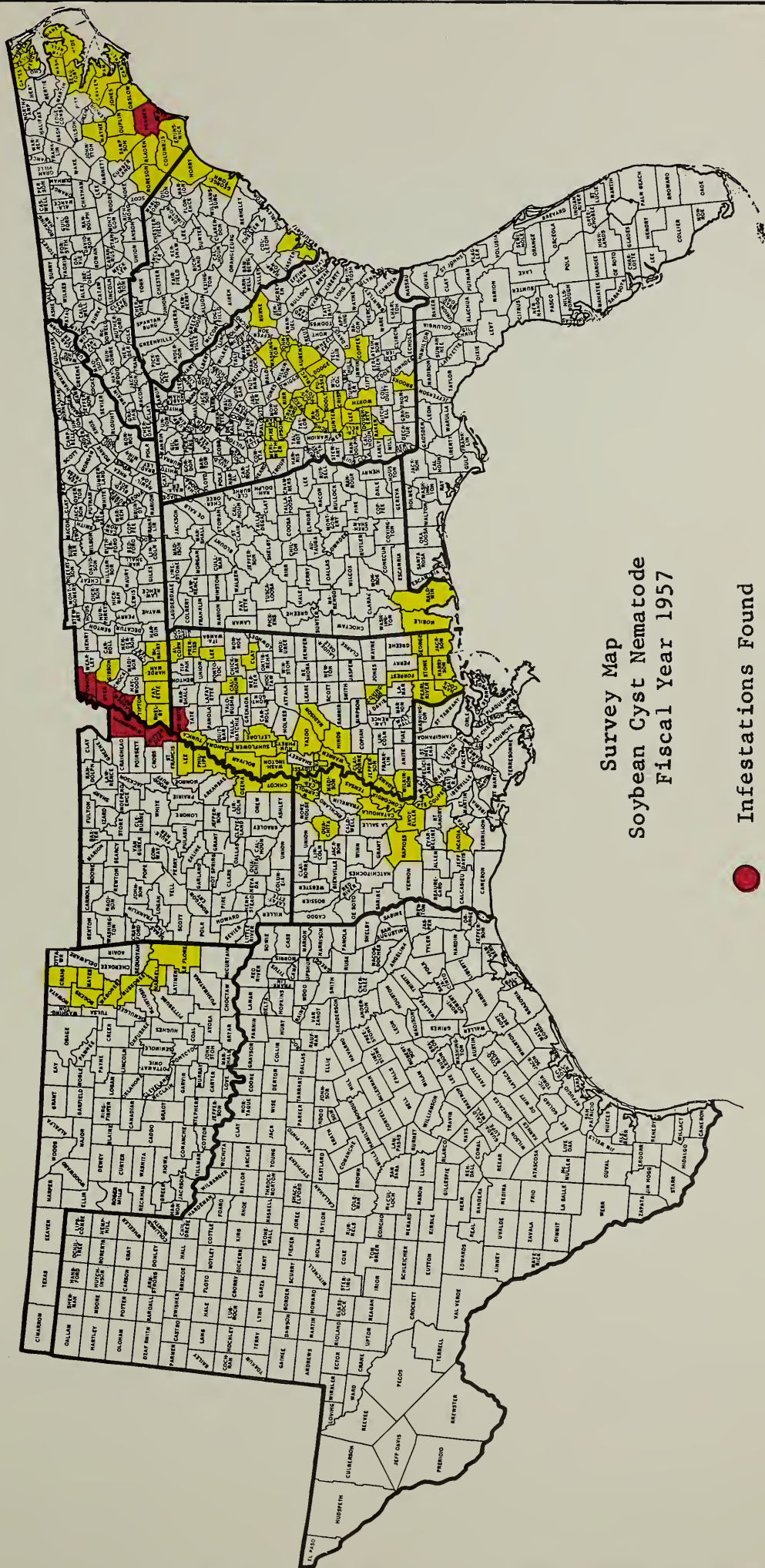
Interested State agencies cooperated with the Division in the development of the soybean cyst nematode program in effect during the fiscal year 1957 through the assignment of personnel, equipment, office space, etc.

SOYBEAN CYST NEMATODE
Fiscal Year 1957

- 5 -

| State | Soil Survey | | Plant Inspection | | Infestations Confirmed | | Remarks |
|----------------|-------------|--------|------------------|---------|------------------------|-------|---------|
| | Properties | Acres | Properties | Acres | Properties | Acres | |
| Alabama | 92 | 4,733 | 0 | 0 | 0 | 0 | |
| Arkansas | 488 | 13,243 | 1 | 25 | 15 | 343 | |
| Georgia | 93 | 1,565 | 25 | 135 | 0 | 0 | |
| Louisiana | 77 | 5,426 | 9 | 1,669 | 0 | 0 | |
| Mississippi | 278 | 17,123 | 45 | 420 | 0 | 0 | |
| North Carolina | 429 | 7,202 | 4,607 | 113,648 | 15 | 451 | |
| Oklahoma | 9 | 235 | 0 | 0 | 0 | 0 | |
| Tennessee | 488 | 14,309 | 35 | 0 | 32 | 2,724 | |
| Totals | 1,954 | 63,836 | 4,722 | 115,897 | 62 | 3,518 | |

SOUTHERN REGION PLANT PEST CONTROL DIVISION



Survey Map
Soybean Cyst Nematode
Fiscal Year 1957

- Infestations Found
- No Infestations Found

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION

SOUTHERN REGION

ANNUAL PROGRAM REPORT

SWEETPOTATO WEEVIL

July 1, 1956 - June 30, 1957

Cooperating Agencies:

Regulatory, Control, Research, and Extension Agencies of
the Affected States

December 6, 1957
Gulfport, Mississippi

C. C. Fancher
Regional Supervisor

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I. INTRODUCTORY

A. Statement of Problem

The sweetpotato weevil is known to occur in many counties of south and east Texas, areas not included in the cooperative program, in the major part of Louisiana, in several southern counties of Alabama, Georgia, and Mississippi, in three coast counties of South Carolina, and generally throughout Florida. It is most difficult to estimate the total losses caused by the insect to growers for home consumption where the damage ranges from light to complete destruction of the crop, to certified sweetpotato plant growers in certain locations whose business is often completely wiped out, to growers and handlers for cost of control measures, and to shippers in restricted markets. However, weevil losses in the principal commercial centers in the program areas during 1956 were estimated at \$1,500,000 as compared with \$1,750,000 in 1955. The average annual loss to the sweetpotato industry during the past few years in the infested states would exceed \$5,000,000, or about 12 percent of the average annual crop value.

Although the sweetpotato weevil is a one-crop pest, its economic importance has long been recognized, as evidenced by the concerted actions on the part of legislative bodies, pest control officials, entomologists, agriculturists, growers, packers, processors and shippers to effect adequate control. It is the most destructive insect pest of sweetpotatoes in the United States.

B. Program Justification Statement

Federal participation in the cooperative sweetpotato weevil program is justified on the basis that (1) the introduced pest does not exist over its entire ecological range; (2) without control the insect is capable of jeopardizing the sweetpotato industry; and (3) the problem is interstate in nature.

C. Program Objective

The program conducted under state and federal laws is directed at the control of the insect by its eradication from areas where practicable and feasible; by insect population suppression in commercial areas to prevent heavy crop losses; by quarantine enforcement to prevent spread and insure application of control measures; and by supplying technical information to sweetpotato growers, processors, shippers, and others interested in the control of the insect.

As a continuation of efforts to achieve the above objective, work plans were formulated at the beginning of the year and executed without substantial deviation. These plans defined the status of infestation, proposed work areas, and outlined

responsibilities of cooperative agencies. Plans for program operational functions included (1) planning and direction, (2) technical assistance, (3) survey, (4) eradication or control, and (5) regulatory.

E. Status of Infestation

With the beginning of the fiscal year 1957, there were 98 infested counties in the work areas, with 4,271 recorded infestations in eradication areas. At the close of the fiscal year there were 106 infested counties in the work areas, with 4,254 recorded infestations in eradication areas. The work area increase was due to the finding of 16 additional infested counties.

Program-wide infestation status and losses during 1957 were slightly less than 1956.

II. PROGRAM HISTORICAL INFORMATION

The sweetpotato weevil was probably introduced from the West Indies and was first reported in this country in the vicinity of New Orleans, Louisiana, about 1875. From its beginning the insect has spread throughout the southern portion of the Gulf Coast and South Atlantic States.

The first federal-state program to combat the pest was initiated in 1918 and discontinued in 1934.

The present program was initiated in 1937 by a federal appropriation of \$75,000 restricted for use in states providing adequate cooperation. This limitation remains intact. While funds from both governmental agencies have gradually increased, state participation has averaged 70 percent of allocated funds.

III. PROGRAM ACTIVITY DURING FISCAL YEAR

A. Planning and Direction

With the beginning of the fiscal year 1957, workloads within budget limitations in each of the cooperative states were evaluated, and available federal assistance was prorated for use in the individual states on the basis of needs and adequacy of state cooperation. Following conferences with state cooperators and area supervisors, quarantines were revised where necessary to provide for insecticidal control in lieu of non-planting zones in many areas, thereby affording greater latitude for sweetpotato production in the more generally infested areas.

Personnel at all levels of supervision were furnished work plans, and appropriate checks at necessary intervals were made throughout the year for program progress.

Necessary surveys and proper supervision of control operations in the present program areas would require double the present manpower, which means twice the present budgets. Additional funds are needed for program extension into several Texas counties bordering present work areas.

B. Technical Assistance

Extension entomologists and county agents in infested counties continued to render valuable assistance to the program. The Extension entomologists furnished articles for statewide news publications, and the county agents furnished news releases for local publications and called grower meetings for discussion of quarantines and program controls. Many of these agents displayed maps in their offices indicating infested areas of the county.

Program personnel complied with many grower requests for information on sweetpotato weevil control by correspondence, personal contact, bulletins, picture sheets, quarantine digests, and demonstrations. Information for purposes of revising regulated areas was furnished state pest control officials as requested, as well as tentative quarantine draft proposals providing for insecticidal treatment of seed beds and field plantings.

C. Survey

The survey objectives were (1) to detect and delimit the pest in new areas, (2) to determine severity of infestation in commercial areas, (3) to detect new infestations in known infested areas, and (4) to evaluate control effectiveness.

Visual inspections of sweetpotatoes and sweetpotato vines and crowns were made in the fields during and immediately following harvest, in plant beds, in volunteer plants, and of sweetpotatoes in storage and market locations. The most effective inspections were during the fall months during peak abundance of insect population and inspection material.

Survey coverage included 122,905 inspections in 218 counties that may be classified for descriptive purposes as (1) counties in which no infestations were found, (2) counties in which infestations were found for the first time, (3) counties found to be reinfested, (4) counties released from planting restrictions because the insect could no longer be found, and (5) counties known to be infested at the beginning and end of the fiscal year. Survey results were negative in 112 counties, including 8 formerly infested counties. Infestations were found for the first time in 10 counties, and reinfestations were found in 6 counties. Active infestations remained in 90 old counties, constituting the major portion of the program areas. New areas of infestation included Coffee and Marengo Counties, Alabama; Sumter County,

Georgia; Ouachita and Red River Parishes, Louisiana; Adams, Copiah, Perry and Simpson Counties, Mississippi; and Jasper County, South Carolina.

Reinfested areas included Appling, Brantley, Brooks and Terrell Counties, Georgia; and Amite and Stone Counties, Mississippi.

Formerly infested counties in which eradication work had been in progress and in which no infestations were found included Harris, Long, Irwin, Pulaski and Troup Counties, Georgia; Union Parish, Louisiana; and Leake and Oktibbeha Counties, Mississippi.

Surveys disclosed 2,218 new infestations, or about an 8 1/2 percent reduction in similar finds for the previous year. The inspection effectiveness was 1.8 infestations per 100 inspections, as compared with 2.0 for the previous year. Program-wide infested work areas were slightly increased and overall infestation status slightly decreased during the year.

Survey results point out the continued need for further surveys, particularly in outlying areas, for detection of incipient infestations.

D. Eradication or Control

Program objectives include the following: control of the sweet-potato weevil, aimed at the eradication of the insect from outlying areas and from individual farms within infested areas; prevention of heavy crop losses by population suppression in commercial areas; and prevention of further weevil spread by quarantine enforcement.

All treatments and procedures employed had prior appropriate official approval and consisted of sanitary and chemical control methods based on the biology and habits of the pest. The customary manner of production and handling of the sweetpotato crop was continued. Sanitation measures included the removal and effective disposition of host material from seedbeds, fields, and storages, and daily sanitation practices at shipping and processing plants during their active season. The cleaned seedbeds and storage sites were treated with dieldrin or DDT. Field cleaning was accomplished by one or a combination of methods, such as hand-picking, livestock grazing, winter plowing and 2,4-D. In addition to the long established use of DDT and methyl bromide as control measures, dieldrin dust and heptachlor were approved and applied to plant beds and field plantings as a protection to the growing crop.

A brief summary of accomplishments shows that: (1) planting restrictions were removed from 2,055 properties, including all formerly infested properties in 6 counties; (2) clean-up was effected on 15,241 storages and kilns, 15,098 seedbeds, and 62,389 acres; (3) insecticides for field control were applied

• • • • •

to 4,399 seedbeds and 18,141 acres; (4) DDT was applied to 1,401,646 bushels of stored potatoes, and 50,838 bushels of potatoes and 1,844,000 potato plants were fumigated with methyl bromide.

E. Regulatory

Regulatory objectives are the prevention of spread and the eradication or control of the pest where established in important sweetpotato producing areas by compulsory control practices. These aims are sought by the enforcement of uniform state quarantines promulgated by and for the authority of the states concerned. Division participation in quarantine enforcement does not include certification where fees are involved or where the exercise of police powers are indicated.

The firmness of quarantine enforcement and cooperation of law enforcement authorities were reflected during the year by judicial disposition of approximately 80 violations cited to the courts by quarantine enforcement officials. Fines and prison sentences were assessed in 78 cases and 2 were nol-prossed because of extenuating circumstances. The fines plus court costs per case ranged from \$25 to \$100, depending on the nature of the charges. All prison sentences were suspended pending future compliance with quarantine regulations. Sweetpotato weevil quarantines were in force in 14 states. Other than the states of Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina, and Texas, in which the insect now occurs, quarantines to prevent the introduction of the pest were in force in the states of Arkansas, Arizona, California, North Carolina, New Mexico, Oklahoma, and Tennessee.

These quarantines provide that sweetpotatoes originating in regulated areas may be shipped into these states or portions thereof, except Mississippi and Tennessee, under fumigation certificates. The fumigation treatments are outlined in the quarantines.

While the total quantity of sweetpotatoes certified for movement in the program states is not available, 6,000,000 bushels were certified in Louisiana alone.

Since the problem is the hazard of spread in the movement of sweetpotatoes and planting stock from regulated areas, other regulated articles are of no economic importance and do not enter trade channels. While methyl bromide fumigation is the most effective treatment, it is not completely satisfactory because of the narrow margin between product tolerance and lethal dosage.

F. Methods Improvement

Insecticidal control for the growing crop was included in the control measures and incorporated in the Quarantine.

Dieldrin dust and/or heptachlor was applied to 4,399 seedbeds and 18,141 acres.

More effective herbicides and insecticides are needed for field control as rapidly as research and industry can develop them for in these locations the insect is most resistant to control measures.

SWEETPOTATO WEEVIL
Fiscal Year 1957

| Work Operation Units Reported | | | | | | | | | | |
|-------------------------------|------------|-------------------|----------|-------------------|--------------------|----------|---------|---------------|----------------------|-------------------|
| State | Surveys | | | | Control | | | | | |
| | Properties | | Released | Active * Close | Cleaned | | Control | | Insecticides Applied | |
| | Inspected | Found Infested | | | Storage & Kilns | Seedbeds | Acres | Seed- beds | Acres | Dusted Bushels |
| Alabama | 5,669 | 276 | 168 | 397 | 742 | 450 | 883 | 205 | 319 | 1,275 |
| Florida | 2,176 | 150 | 239 | 495 | 30 | 28 | 39 | 523 | 271 | 4,245 |
| Georgia | 11,531 | 340 | 295 | 418 | 539 | 91 | 738 | 416 | 1,359 | 49,950 |
| Louisiana | 94,845 | 1,336 | 1,246 | 2,721 | 13,568 | 14,385 | 50,494 | 3,192 | 16,124 | 1,344,715 |
| Mississippi | 8,158 | 96 | 107 | 192 | 362 | 144 | 235 | 63 | 68 | 1,461 |
| South Carolina | 526 | 20 | 0 | 31 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 122,905 | 2,218 | 2,055 | 4,254 | 15,241 | 15,098 | 62,389 | 4,399 | 18,141 | 1,401,646 |

* June 30, 1957

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I. INTRODUCTORY

A. Statement of Problem

The white-fringed beetle, Graphognathus leucoloma fecundus (Buch.) is a serious insect pest which attacks a wide variety of agricultural crops, has a high reproductive rate, and is extremely difficult to detect at low population levels. It was found in one location in New Jersey which has been treated to a point where complete extermination has been almost accomplished. Continued effort during a few more years should complete the job. This pest has caused millions of dollars worth of damage in the South Eastern States to agricultural crops and at the time it was found in New Jersey it was demonstrating without doubt its ability to do likewise in this State. New Jersey is the only State in which it has been found in this Region.

B. Program Justification Statement

Surveys have indicated that this pest is confined to one small area in one of the 13 States in this Region. Its ability to do extensive damage is well known. The cost of establishing and enforcing quarantines alone would far exceed that of exterminating it.

C. Program Objectives

1. The long term objective is complete eradication. In addition, surveys should be intensified enabling us to detect any unknown or newly established infestations.
2. The objectives for the reporting year were:
 - a. Survey intensively in the infested and treated area and its environs.
 - b. To survey as intensively as possible other locations which may have been exposed to infestation.
 - c. To treat any areas where the pest is found.
 - d. Continue measures designed to prevent spread of the pest.

D. Status of Infestation

The status of infestation as of June 30, 1957 was apparently negative. Beetles were originally found in 1954 in three spots encompassing some 50 acres. This area, together with the adjacent farmland totalling 350 acres, was treated in 1955. A few beetles were found in 1956 in two of these locations. These two, with a safety margin, were retreated after which there were no beetles found throughout the reporting period. The remaining work in this

area consists of continuing survey and treatment as found necessary--until eradication has been accomplished beyond any reasonable doubt.

II. PROGRAM HISTORICAL INFORMATION

The white-fringed beetle was first reported in the United States in September 1936 in Okaloosa County, Florida. It has since been found in extensive areas in North and South Carolina, Georgia, Alabama, Mississippi, Texas, and Louisiana. Research work shows that this insect causes appreciable damage by adults feeding on foliage and larvae feeding on the roots of a wide variety of plants. In 1937 a cooperative control project was established for the purpose of reducing to a minimum the population and spread of this insect, and an accelerated research program started.

The white-fringed beetle is parthenogenetic. Adults under favorable conditions lay as many as 1500 eggs over a period of two to three months. Under favorable conditions sufficiently high populations are established to practically eliminate most agricultural crops and other herbaceous plants from large areas. They also maintain themselves very well on several weeds and can be found along hedges, roadsides, and on wasteland. These characteristics have contributed largely to their persistence and continued spread throughout the South despite control efforts.

Surveys have been made for this pest in non-infested States for several years. Such surveys have by necessity been of a cursory nature. On September 18, 1954 a survey was completed in New Jersey. This work covered selected areas in eleven counties and was confined to a large extent to nurseries, highways, railroad yards, and other "likely sites." In November 1954, Mr. V. Genna, a farmer near Vineland, New Jersey reported insect damage on sweet potatoes to the County Agent. Prompt investigation revealed this to be a white-fringed beetle infestation. The insects had inflicted damage to the sweet potato crop to the extent that they were not harvested. It was learned similar damage occurred on the same land in 1953 and in a very small spot in 1952. A thorough investigation failed to reveal how the pest was introduced. It would appear to have come from North Carolina since these were of a sub-species found only in that State. As much survey as possible during the remainder of 1954 was performed. During the winter, arrangements were made for eradication treatments which were started in March 1955. Thirty acres of cultivated and twenty acres of non-cultivated land was considered infested, however, treatment was applied to 360 acres which included all non-forested land in the immediate area. Treatment consisted of applying emulsified dieldrin to non-cultivated land and granular formulation to cultivated areas. As an added precaution a DDT foliage treatment was also applied to part of the area. Surveys in November 1955 indicated 90% mortality and by December it approached 99%.

In 1956, an intensive survey of the infested area revealed the presence of a few living white-fringed beetles. All found showed evidence of having been affected by chemicals. In August 1956 fourteen acres, including all the area where chemically affected beetles were found, were retreated with granular dieldrin. Soil sampling in the late fall of 1955 and 1956 did not result in recovery of any larvae.

III. PROGRAM ACTIVITY DURING FISCAL YEAR

A. Planning and Direction

The planning and direction of this work is jointly between New Jersey State Department of Agriculture and the Plant Pest Control Division. In other states, plant pest control officials participate in the planning of surveys.

B. Technical Assistance

Experienced white-fringed beetle control men have been assigned to this work each year, beginning in 1954, by the Southern Region. Their recommendations have been reviewed and followed by New Jersey Department of Agriculture and Division personnel who jointly performed the work. In this manner the full benefit of previous research and experience in all phases of the work was obtained.

C. Survey

State and Federal personnel conducted intensive surveys covering virtually every foot of the previously known infested areas during July, August, and September of 1956 and May and June of 1957. More than 1300 man-hours were spent in this work which includes observations for new infestations in the general vicinity. During November of 1956 a total of 117 soil samples were collected and processed in an attempt to recover white-fringed beetle larvae. The samples were taken from previously known infested ground and some adjacent areas. All samples were found negative. The procedures used in survey, and in the collecting and processing of soil samples, were all standard as practiced in the Southern Region. Survey and scouting included an examination of 3865 properties in New Jersey. Surveys of a more cursory nature were made in other states, especially Virginia, Maryland, and Delaware.

D. Eradication or Control

The objective of this work is complete eradication, by a continued process of survey and treatment. The original infestation is estimated to have covered 50 acres all of which has been treated, and part re-treated with apparent success. There was no crop loss during this fiscal year since the insect is practically exterminated.

E. Regulatory

A State quarantine order involving infested property, roughly paralleling the provisions of the Federal Quarantine, was issued by the New Jersey Department of Agriculture and, remains in effect. Inspectors make frequent visits in the area to assure continued compliance with quarantine requirements.

UNITED STATES DEPARTMENT OF AGRICULTURE
 AGRICULTURAL RESEARCH SERVICE
 PLANT PEST CONTROL DIVISION

WHITE-FRINGED PEEPLE

Region Eastern

Summary of Regional Field Activity

Fiscal Year 1957

| State | Properties Surveyed* | | New Finds | | Nursery Treatments Acres | Farmland Treatments | | Non-Farm Treatments | |
|------------|---------------------------|-------|---------------------------|--------------------|--------------------------------|---------------------|---------------------|---------------------|-------------------------|
| | Found Infested Nursery | Other | No Infesta- tion Found | Number of Prop. | Infested Acres | Broadcast Acres | Fertilizer Acres | Surface Acres | Foliage (Agg.) Acres |
| New Jersey | - | 2** | 3865 | - | - | - | - | 14 | - |
| Total | - | 2** | 3865 | - | - | - | - | 14 | - |

*City block considered property unit in towns.

**Previously found infested in Fiscal Years 1955 and 1956

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LIBRARY

1900

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UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION

SOUTHERN REGION

ANNUAL PROGRAM REPORT

WHITE-FRINGED BEETLE

July 1, 1956 - June 30, 1957

Cooperating Agencies:

Regulatory, Control, Research, and Extension Agencies
of the Affected States

December 6, 1957
Gulfport, Mississippi

C. C. Fancher
Regional Supervisor

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I. INTRODUCTORY

A. Statement of Problem

The white-fringed beetle is known to be present in eight states in the Southern Region: Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee. The acreage actually infested with the beetle amounts to some 610,446 acres. The beetle feeds on at least 385 species of plants, including cotton, corn, peanuts, soybeans, and other important farm crops of the South. Many of these plants are widely distributed, so that host plants are not a limiting factor in the spread of the beetle. The insects thrive in subtropical and temperate zones, and, therefore, can adapt themselves to a considerable portion of the United States.

B. Program Justification Statement

Because it attacks a wide variety of crops, the white-fringed beetle is a potential pest throughout the southern half of the United States. The greater part of the damage results from the soil-inhabiting larvae which attack the roots of the plants. Heavy damage to field crops, ranging as high as 70 percent, occurred in the area where the beetle was originally found in 1936, 1937, and 1938, before adequate control measures were developed.

The minutes of the 1937 Southern Plant Board meeting, held at De Funiak Springs, Florida, state that 2 bushels of beetles (80,000 to 90,000) were shaken from the plants on 1/2 acre of cotton and that 65 beetles were found around the roots of a dead apple tree.

In 1940, it was reported that more than 1200 acres of farmland had been left out of production for the preceding two years in the vicinity of Florala, Alabama, because even after two to five plantings, in a single season, crops could not be produced in a sufficient quantity to justify harvesting.

Plant damage, which now is found only at newly infested points or where control measures have been relaxed, demonstrates the destructive nature of the pest and the crop losses which it may possibly cause. As recently as 1954, crop losses of approximately 34 percent were experienced in Mobile County, Alabama, where potatoes were planted on untreated land. Should the insect spread to noninfested areas in the United States, the cost to farmers and growers of providing insecticides for its control could be tremendous.

C. Program Objective

The long-range objective of the program is eradication of the white-fringed beetle. The immediate objectives were to conduct surveys in order to locate new infestations of the pest; to

suppress populations of beetles through assisting growers and other individuals in applying control measures, thereby eliminating crop losses and preventing further spread of the insect; to carry out cooperative control measures on idle and waste lands for the purpose of reducing beetle populations and preventing spread of the pest; to conduct cooperative eradication measures at points of outlying infestation; and to enforce the white-fringed beetle quarantine.

D. Changes from Work Plan

Basic work plans developed for the White-Fringed Beetle program at the beginning of the 1957 fiscal year were completed without major changes.

E. Status of Infestation

White-fringed beetles, on June 30, 1957, were known to be infesting 610,446 acres in 199 counties of 8 states in the Southern Region. In Georgia, Appling and Hancock Counties were dropped from infested status since no beetles had been found for several years. Eleven newly infested counties were found during the year in 6 states.

II. PROGRAM HISTORICAL INFORMATION

The white-fringed beetle was first reported in the United States in July 1936 in Okaloosa County, Florida, where these insects were causing injury to peanuts. Survey in adjacent areas revealed the presence of the insect in northern Walton County, Florida, and in contiguous areas in Covington and Geneva Counties, Alabama. Infestations of the insect were subsequently revealed in Louisiana and Mississippi in 1937, in North Carolina in 1942, in Georgia and South Carolina in 1946, and in Tennessee in 1948. The insect was probably introduced into the United States from South America, where it is known to occur extensively in Argentina, Chile, Uruguay, and Brazil.

The white-fringed beetle program is a cooperative endeavor, combining the activities of the Division, state and local governments, and private concerns and individuals. Growers, industrialists, and other private individuals concerned furnish the labor and insecticides for the control of the insect on their properties; the states furnish some labor and insecticides for control on idle and waste lands, highway rights-of-way, etc.; and the Division assists through technical planning, coordinating and supervising the control activities, furnishing specialized spray equipment where required, and applying control measures on waste and idle land.

III. PROGRAM ACTIVITY DURING FISCAL YEAR

A. Planning and Direction

Plans for cooperative survey and control operations were discussed in detail with officials of the plant pest quarantine

and control agencies in the several states of the Southern Region. Programs were directed by Division employees.

B. Technical Assistance

All control procedures are based on research data of the Cereal and Forage Insects Section of the Entomology Research Division. Extension Service, through the county agents, entomologists, and other workers assisted by disseminating information to the general public through newspaper releases, radio talks, farm meetings, etc.

C. Survey

Surveys were conducted (1) to locate new infestations, (2) to delimit infestations already known to exist in order to plan control action and guide quarantine enforcement, (3) to determine population density and degree of damage, (4) to support community-type control programs, (5) to evaluate or determine the effectiveness of control treatments applied at isolated infestations for certification purposes, (6) to determine the eligibility for certification of farm machinery, construction machinery, and incidental shipments, and (7) to determine the infestation status of nurseries and other sites where regulated products are grown or stored.

Inspection for white-fringed beetles is a slow and tedious procedure. Detection difficulty makes white-fringed beetle inspection costly and time-consuming. Applying the favored host plant technique to inspection work has fostered much progress; however, a successful mechanical inspection machine would assist greatly. Larval and adult inspection are the principal means of detecting white-fringed beetles. Inspection is made for adults by looking for feeding signs on favored host plants and by actual inspections for the beetle. These inspections are made around railroad yards, highway rights-of-way, and other places where the insect is most likely to appear. Larval inspections are made by digging in the soil early in the year while the immature stage of the beetle is still underground. Specimens collected from new areas are submitted to the Gulfport Headquarters laboratory for identification, and those involving new counties are forwarded to Washington for confirmation. A faster means of survey should be devised, if possible, to speed up survey. A suggestion has been made to adapt the soil-washing machine for the soybean cyst nematode to screen out white-fringed beetle larvae and adults that might be in the soil samples. Perhaps adaptations of other types of equipment might expedite survey. Inspection of combines during the harvest of small grains, when the grain is being transferred from combine to wagon or truck, offers an opportunity of getting a good cross section from a large area in a short time.

Surveys were made in 10 states of the Region, and following is a brief summary of results by states.

- Alabama: Inspections were made on 10,767 properties with negative results; 14 nurseries were found infested or reinfested and were promptly treated; 57,724 additional acres were found infested on 279 properties. Choctaw County was found infested for the first time.
- Arkansas: Surveys were made in approximately 102 general locations in 15 counties in the eastern part of the state. No infestations were found.
- Florida: Inspections were made on 2,350 properties in 19 counties. Calhoun and Gadsden Counties were found infested for the first time.
- Georgia: New infestations were found in 3 new counties: Carroll, Chatham, and Schley. In addition, several new infestations were found in counties already known to be infested.
- Louisiana: Inspections were made on 1,483 properties in 35 parishes, with 20 properties containing 186 acres found infested, one of which was a nursery. Most of this infestation was an extension of the known infested areas. No new parishes were found infested, and no beetles have been found in Iberia Parish for the past several years.
- Mississippi: White-fringed beetle infestations were found in De Soto, Kemper, and Neshoba Counties for the first time. Several recurrences were found in the Delta counties, and additional acreages were added to the previously known infested areas.
- North Carolina: Bladen County was found infested for the first time. Delimiting inspections increased the infested acreage at 53 locations, bringing the total acres classified as infested in the state to 34,098.
- South Carolina: No new areas of infestation were found. Extensions were found at a few of the infested areas, particularly in Horry County. Beetle infestations within the infested area were light.
- Tennessee: Surveys were made in 21 counties, 4 of which were found infested. Henry County was found infested for the first time. Of the 3,682 properties surveyed, 12 acres of farmland and 484 acres of urban property were found infested.

Texas: Surveys were made in Harris County, and no indication of infestations was found.

More comprehensive coverage, either through added personnel or improved inspection techniques, is necessary for the development of eradication areas, as well as to determine more fully the status of infestation over the entire area. Also, special attention should be given again to an intensive survey of those infestations and surrounding areas where overall control treatments will be applied.

D. Eradication or Control

While the overall aim is eradication of the white-fringed beetle, the immediate concerns are (1) preventing crop damage in generally infested areas, and (2) preventing dissemination of the beetles to areas not known to be infested.

These objectives are accomplished by making annual surveys, eradicating incipient infestations located by such surveys, and directing the application of insecticides to generally or severely infested areas to reduce crop losses and aid in preventing migration to other areas. These practices, while directed primarily toward affording immediate relief to nurserymen and farmers, are contributing to the overall aim of eradication. Wherever possible, insecticidal treatments are made at rates consistent with amounts recommended for complete elimination of the insect.

Surveys of some 46,099 properties were made in 10 states of the Southern Region. Infestations were found on 16 nurseries in 3 states and on 5,872 other properties in 8 states. No infestations were found in Arkansas or Texas. Beetle infestations were found for the first time on 968 properties, involving 97,419 acres. More than half of the newly infested acreage was in Alabama. At the end of the report year, 199 counties in 8 of the Southern states were known to be infested and the known infested acres in those counties totaled 610,446. A classification of this acreage into its various common categories shows 166,356 acres of industrial, public, or residential land; 1,974 in nurseryland; 298,491 in tilled or untilled farmland; and 193,625 in woodland. A further analysis of this infested acreage shows that no white-fringed beetles were found on the last inspection of 192,162 acres, or 31.5 percent of the total; 379,437 acres, or 62.1 percent, showed light to moderate infestations; and only 38,847 acres, or 6.4 percent supported heavy populations.

Treatments with approved dosages of insecticides were made to 2,435 acres of nurseryland; as a broadcast application to 10,193 acres, and with fertilizer to 28,192 acres of farmland; as a surface application to 15,002 acres of nonfarmland; and as foliage sprays to 61,258 aggregate acres.

Changes that might be recommended to improve control or eradication procedures would, of course, include improved survey or inspections, which has been pointed out under "Survey," since the beetle must be located before control or eradication measures can be applied. Next in importance is the need for less expensive insecticides and methods of application. These detection difficulties and the high cost of treatment seem to be the chief barriers to eradication of this insect.

E. Regulatory

A most important function of this program is prevention of spread of white-fringed beetles from infested to noninfested areas. This phase of the program is carried out under the examination, treatments, and restrictions specified by Federal Quarantine No. 72, and paralleling state quarantines issued by the several infested states. In connection with the various regulatory inspections and treatments, 145,764 certificates were issued to cover shipment of plants, soil, machinery, etc., from infested areas. Nurseries in the regulated areas are kept treated with the prescribed soil applications to assure free movement of plants.

Quarantine No. 72 and Administrative Instructions were revised during the year.

F. Methods Improvement

Treatment of nursery environs with granular insecticides as a surface application in lieu of the repeated foliage sprays was recommended and adopted in many instances. This method saved much time and has the added advantage of lasting for three years.

G. Other

Plant Pest Control Agencies of the several infested states cooperated in the planning and directing of all phases of the program and in furnishing materials and inspectors for carrying out the various phases of the work. Other federal and state agencies cooperated by furnishing insecticides and labor for treating lands owned or operated by them, by calling meetings of farmers to discuss control programs, by distributing bulletins and pamphlets, and by radio and television discussions.

TABLE NO. I. WHITE-FRINGED BEETLE SURVEYS AND INSECTICIDE TREATMENTS

FISCAL YEAR 1957

| State | Properties Surveyed* | | | New Finds | | Nursery Treatments Acres | Farmland Treatments | | Non-Farm Treatments | |
|----------------|----------------------|----------|-----------------------------|-----------------|-------------------|--------------------------------|---------------------|---------------------|---------------------|-------------------------|
| | Found Nursery | Infested | No. Infesta- tions Found | No. of Prop. | Infested Acres | | Broadcast Acres | Fertilizer Acres | Surface Acres | Foliage (Agg.) Acres |
| | | | | | | | | | | |
| Alabama | 14 | 1,023 | 10,767 | 279 | 57,724 | 969 | 4,605 | 24,588 | 3,109 | 11,104 |
| Arkansas | 0 | 0 | 72 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Florida | 0 | 192 | 2,057 | 107 | 13,354 | 43 | 720 | 2,077 | 697 | 1,453 |
| Georgia | 0 | 3,657 | 12,560 | 307 | 14,642 | 74 | 3,207 | 1,452 | 5,258 | 40,727 |
| Louisiana | 1 | 19 | 1,483 | 9 | 186 | 700 | 0 | 0 | 311 | 695 |
| Mississippi | 1 | 719 | 6,562 | 115 | 7,082 | 301 | 920 | 0 | 825 | 6,199 |
| North Carolina | 0 | 108 | 4,458 | 53 | 3,690 | 99 | 718 | 75 | 3,517 | 732 |
| South Carolina | 0 | 4 | 457 | 4 | 257 | 5 | 0 | 0 | 258 | 0 |
| Tennessee | 0 | 150 | 1,694 | 94 | 484 | 244 | 23 | 0 | 1,027 | 348 |
| Texas | 0 | 0 | 101 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 16 | 5,872 | 40,211 | 968 | 97,419 | 2,435 | 10,193 | 28,192 | 15,002 | 61,258 |

*City block considered property unit in towns.

TABLE NO. 2. TYPES OF INFESTED ACREAGE

FISCAL YEAR 1957

| State | Industrial, Public, and Residential | Nursery | Farmland | | Woodland | Total |
|----------------|---|---------|----------|----------|----------|---------|
| | | | Tilled | Untilled | | |
| Alabama | 57,744 | 978 | 57,568 | 47,972 | 72,815 | 237,077 |
| Florida | 8,671 | 73 | 25,691 | 12,710 | 25,728 | 72,873 |
| Georgia | 23,385 | 323 | 58,942 | 9,480 | 5,907 | 98,037* |
| Louisiana | 15,550 | 99 | 1,434 | 3,897 | 1,260 | 22,240 |
| Mississippi | 39,481 | 232 | 32,760 | 22,522 | 34,953 | 129,948 |
| North Carolina | 12,522 | 148 | 16,243 | 2,668 | 2,517 | 34,098 |
| South Carolina | 1,433 | 33 | 4,283 | 559 | 352 | 6,660 |
| Tennessee | 7,570 | 88 | 1,543 | 219 | 93 | 9,513 |
| Totals | 166,356 | 1,974 | 198,464 | 100,027 | 143,625 | 610,446 |

*Appling and Hancock Counties removed from infested area.

TABLE NO. 3. STATUS OF WHITE-FRINGED BEETLE POPULATIONS

FISCAL YEAR 1957

| State | No Specimens Found | | Light Populations | | Moderate Populations | | Heavy Populations | | Grand Total | |
|----------------|--------------------|----------|-------------------|----------|----------------------|----------|-------------------|----------|-------------|----------|
| | Acres | Per-cent | Acres | Per-cent | Acres | Per-cent | Acres | Per-cent | Acres | Per-cent |
| Alabama | 53,392 | 22.5 | 84,438 | 35.6 | 73,893 | 31.2 | 25,354 | 10.7 | 237,077 | 100 |
| Florida | 22,832 | 31.4 | 18,812 | 25.8 | 22,682 | 31.1 | 8,547 | 11.7 | 72,873 | 100 |
| Georgia | 45,897 | 46.8 | 45,490 | 46.4 | 5,977 | 6.1 | 673 | 0.7 | 98,037 | 100 |
| Louisiana | 18,987 | 85.4 | 2,760 | 12.4 | 488 | 2.2 | 5 | 0.0* | 22,240 | 100 |
| Mississippi | 30,512 | 23.5 | 68,701 | 52.8 | 27,259 | 21.0 | 3,476 | 2.7 | 129,948 | 100 |
| North Carolina | 12,995 | 38.1 | 16,264 | 47.7 | 4,260 | 12.5 | 579 | 1.7 | 34,098 | 100 |
| South Carolina | 3,527 | 53.0 | 3,083 | 46.3 | 50 | 0.7 | 0 | 0.0 | 6,660 | 100 |
| Tennessee | 4,020 | 42.3 | 4,050 | 42.6 | 1,230 | 12.9 | 213 | 2.2 | 9,513 | 100 |
| Totals | 192,162 | 31.5 | 243,598 | 39.9 | 135,839 | 22.2 | 38,847 | 6.4 | 610,446 | 100 |

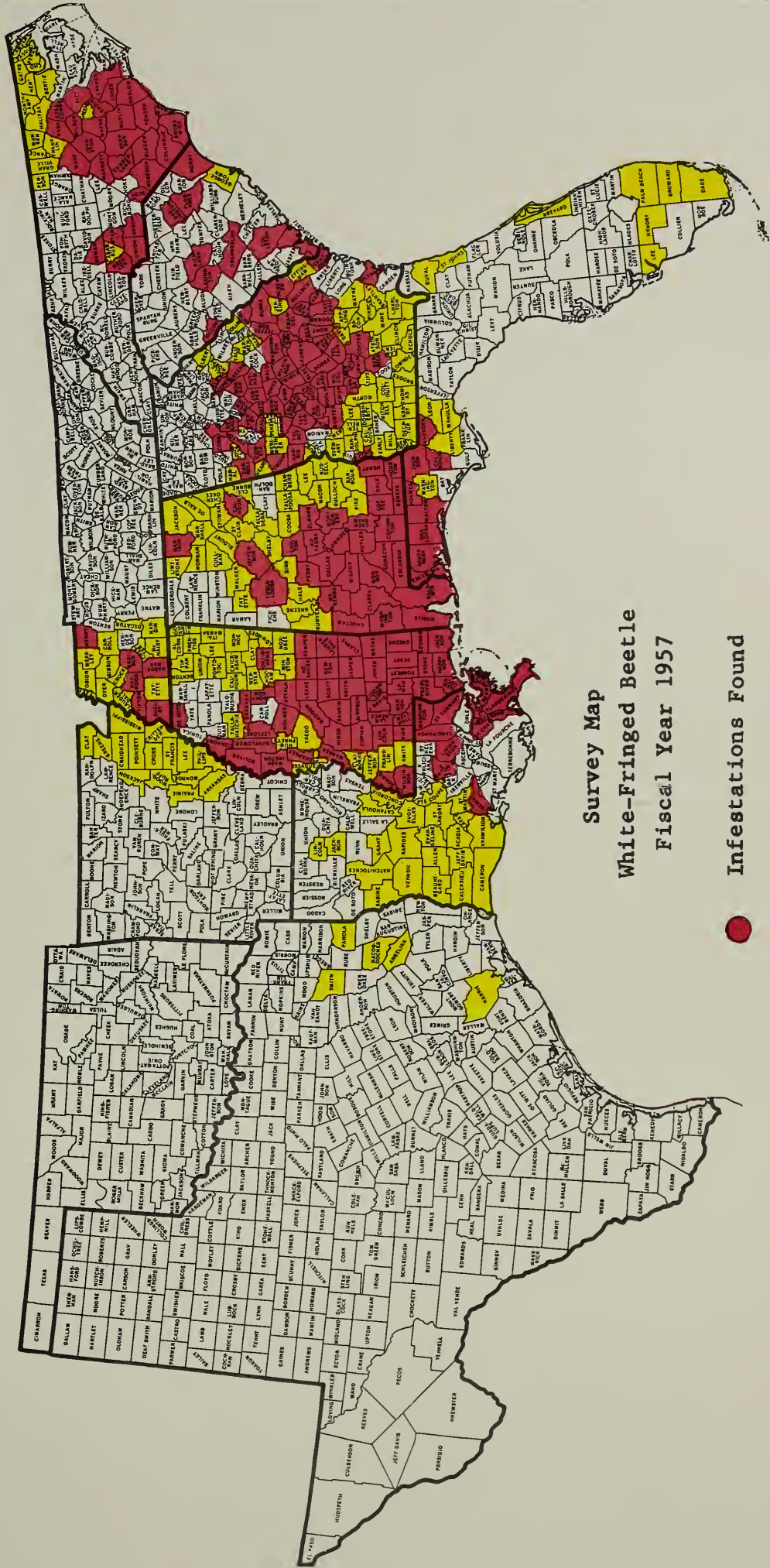
*Less than 1/10 of 1 percent.

TABLE NO. 4. WHITE-FRINGED BEETLE REGULATORY CERTIFICATES ISSUED

FISCAL YEAR 1957

| Commodity | Certificates Issued | | | | |
|---|---------------------|---------|--------|-------|---------|
| | A | B | C | D | Total |
| Soil, compost, manure, peat, muck, clay, sand, gravel | 392 | 7,586 | 804 | 0 | 8,782 |
| Nursery stock | 3,062 | 111,380 | 1,641 | 0 | 116,083 |
| Grass Sod | 71 | 1,105 | 2 | 0 | 1,178 |
| Plant crowns or roots for propagation | 56 | 4,347 | 1 | 0 | 4,404 |
| Uncleaned grass, grain, legume seed | 0 | 261 | 5 | 4 | 270 |
| Potatoes (Irish) | 27 | 6 | 377 | 0 | 410 |
| Bulbs, corms, tubers, rhizomes of ornamental plants | 131 | 1,815 | 234 | 0 | 2,180 |
| Hay and straw | 0 | 0 | 374 | 3 | 377 |
| Peanuts in shells and peanut shells | 305 | 268 | 54 | 870 | 1,497 |
| Scrap metal and junk | 2 | 645 | 5,991 | 8 | 6,646 |
| Earth-moving machinery | 6 | 243 | 1,261 | 1 | 1,511 |
| Seed cotton and cottonseed | 1 | 0 | 2 | 67 | 70 |
| Forest products | 1 | 0 | 1,389 | 30 | 1,420 |
| Soybeans | 0 | 0 | 2 | 175 | 177 |
| Miscellaneous | 202 | 392 | 165 | 0 | 759 |
| Totals | 4,256 | 128,048 | 12,302 | 1,158 | 145,764 |

SOUTHERN REGION PLANT PEST CONTROL DIVISION



UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION

SOUTHERN REGION

ANNUAL PROGRAM REPORT

WILD COTTON ERADICATION

July 1, 1956 - June 30, 1957

Cooperating Agencies:

Regulatory, Control, Research, and Extension Agencies of
the Affected States

December 6, 1957
Gulfport, Mississippi

C. C. Fancher
Regional Supervisor

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I. INTRODUCTORY

A. Statement of Problem

During fiscal year 1957 the problem, geographically and in terms of survey and control needs, was essentially the same as in 1956. The wild cotton plant, a primary host to pink bollworms which attack cotton, occurs in 11 counties of southern Florida, ranging from Hillsborough County to Monroe County. The subtropical climate present in this area permits the many hundred separate colonies of wild cotton plants to produce food for the pink bollworm the year-round if not destroyed. To further complicate the problem, seeds of the wild cotton plant are extremely viable and can germinate, under favorable conditions, after lying dormant for many seasons. The wild cotton plant seed is disseminated by birds, animals, high tides caused by storms, and to some extent by the wind.

Certain hibiscus and various other kinds of cotton plants are grown in this same general area as dooryard ornamentals. To keep the pink bollworm threat low, all host plants should be examined at least annually. Host plants other than wild cotton are destroyed when found infested; however, the wild cotton plant, wherever found, is destroyed regardless of the presence or absence of the pink bollworm.

B. Program Justification Statement

The pink bollworm threat to the cotton industry in Alabama, northern Florida, Georgia, Mississippi, and parts of South Carolina can be eliminated only by eradicating this pest which is now present in small numbers throughout the area in which wild cotton work is being conducted. In the meantime, it is essential to hold pink bollworm infestations to the lowest possible degree to prevent spread to domestic cotton-producing areas in the southeastern states. This major cotton pest is capable of rapid spread if control and eradication measures are not promptly applied, and a general infestation in domestic cotton-producing areas would probably reduce cotton production to a great extent, in addition to making the cost of cotton production prohibitive to many growers, particularly in areas already infested by the boll weevil.

C. Program Objective

The long-range objective of the wild cotton program is eventual eradication of the pink bollworm in southern Florida. This can be realized only by the elimination of all wild cotton plants and by sufficient inspections of other host plantings in this area to be certain that they are not infested with the pink bollworm. The immediate goal is to keep pink bollworm host plants at a minimum, thus making spread of the pink bollworm to the

cotton areas to the north very unlikely. The immediate and long-range objectives, obviously, are contingent upon the total amount of money made available for wild cotton eradication on an annual basis.

D. Changes from Work Plan

The work, accomplished during 1957 fiscal year, follows very closely the work plan submitted at the beginning of the year. There was a two-week delay in field operations in the Cape Sable Area, Monroe County, Florida, due to excessive rains in late February and early March. Dense populations of mosquitoes also proved to be a contributing factor to early suspension of the work, and key personnel found it necessary to perform some road repair and surfacing at the beginning of the program, which was not included in the original work plan.

E. Status of Infestation

Only three colonies with nine pink bollworm specimens were found on Plantation Key, and two colonies with three specimens in the Cape Sable Area. Both of these locations are in Monroe County in the extreme southern part of Florida. In this connection, however, it must be remembered that certain areas within the 11-county area in which wild cotton plants occur were not thoroughly scouted. By comparison, infestations found during the year were slightly less than found in 1956.

II. PROGRAM HISTORICAL INFORMATION

Wild cotton eradication work was begun in 1932. Except for the years 1947 and 1948, this program has continued without interruption until the present time. Wild cotton plants have no economic value but are important because they are host for the pink bollworm of cotton. These plants are found in over 900 separate colonies comprising approximately 17,000 acres and distributed over many thousands of acres of dense swamps and jungle. Many of these are located in remote and almost inaccessible areas, and over 500 of them can be reached only by boat.

III. PROGRAM ACTIVITY DURING FISCAL YEAR

A. Planning and Direction

After the allotment of funds was determined, control and survey plans were completed in detail. Factors including overabundance or shortage of rain prior to starting actual field operations exert an influence on the operations. Usually the period from mid-November through mid-April provides optimum working conditions.

B. Technical Assistance

All required technical assistance was provided by local Division personnel immediately responsible for this work. Inspectors of

the Florida State Plant Board provided data relative to the location of ornamental or dooryard cotton plants and other host plants while making their routine inspections of groves and/or nurseries within their respectively assigned areas.

C. Survey

Employees regularly assigned on wild cotton work were always on the lookout for pink bollworm host plants while engaged on other programs. A number of host plants in cities were located and destroyed during the past season by personnel engaged in trapping operations for the Mediterranean Fruit Fly Program.

To locate and delimit infestations, full-time surveys were made by examining as many host plants as time would permit. Suspicious specimens were submitted to the laboratory for identification.

During the year, 25,220 acres of island and jungle lands above high tide in 11 coastal counties of Florida were cleaned, from which 40,107 wild cotton plants were destroyed. The area covered extends from the town of Hudson in Pasco County to offshore islands 20 miles west of Key West in Monroe County. Only one small wild cotton colony has been found on the east coast of Florida and this was near the town of Grant in Brevard County.

More survey work should be done in towns located in Dade and Broward Counties, Florida, due to the presence of cotton plants in yards. There is the possibility of considerable buildup in pink bollworm infestation of fruiting forms in these areas, which could be scattered into the cotton areas to the north by some of the thousands of visitors arriving and departing from that area every winter.

D. Eradication or Control

Complete eradication of all wild cotton plants in the swamps and everglades of southern Florida will require a greatly expanded program. During the past several seasons, areas known to harbor wild cotton plants have been cleaned one time. The remaining funds have been spent performing work on those areas where most cottonseed may have germinated between cleanings and in the jungle areas where plants may have been missed on the first cleaning. A more satisfactory arrangement would be to work all areas twice and the more susceptible cotton-producing areas a third time.

The procedure used to destroy wild cotton plants was by scouting the known wild cotton-producing areas. Laborers properly spaced so that plants were visible between employees minimized the hazard of missing plants. String was used as a guide line to prevent overlapping or not covering some area that should have been worked. Plants were pulled by the roots and exposed to

the sun in order to dry out and prevent new growth. When plants were found growing in coral rocks and the roots could not be pulled, the trunk was cut a few inches above the ground, split, and treated with sodium arsenite.

E. Regulatory

Since there is no commercial cotton grown in the immediate vicinity where wild cotton grows, no Federal quarantine has been involved. The State of Florida has passed a regulation prohibiting the growth of cotton in 17 south Florida counties.

F. Methods Improvement

In cooperation with the Florida Experiment Station and several chemical companies, a number of herbicides and soil sterilizing agents were tested relative to destroying various stages of wild cotton growth. Since wild cottonseed may lie dormant in the soil for a number of years, it is hoped that some chemical may be discovered that will hasten the germination of such seed. This phase of the program has not sufficiently advanced to submit definite results at this time.

G. Other

County agents cooperated in the distribution of information relative to the hazard of growing domestic cotton plants in towns and cities of southern Florida.

The Everglades National Park Service donated a camp site on which the Division erected the labor camp to house employees. This agency also provided crushed rock for the building of several hundred yards of a secondary road leading from the main surfaced park road to the labor camp site.

Occasional news stories were furnished the newspapers (agricultural editors) on the potential hazards of the growth of wild cotton and allowing domestic cotton plants to grow in back yards of residential sections.

As a result of the printing of such stories, many readers have reported the location of domestic cotton plants in their vicinity. Fishermen also have reported to Division employees wild cotton locations which they have found while navigating and camping in the offshore islands.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL DIVISION

SOUTHERN REGION

ANNUAL PROGRAM REPORT

WITCHWEED

July 1, 1956 - June 30, 1957

Cooperating Agencies:

Regulatory, Control, Research, and Extension Agencies
of the Affected States

December 6, 1957
Gulfport, Mississippi

C. C. Fancher
Regional Supervisor

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1. The first part of the report is a general introduction to the project. It describes the purpose of the study and the objectives of the research. It also provides a brief overview of the methodology used in the study.

2. The second part of the report is a detailed description of the data collection process. It explains how the data was gathered and how it was analyzed. It also discusses the limitations of the study and the potential for future research.

3. The third part of the report is a discussion of the results of the study. It compares the findings with the objectives of the research and discusses the implications of the results. It also provides a conclusion and recommendations for future research.

4. The fourth part of the report is a summary of the findings of the study. It provides a brief overview of the results and discusses the implications of the findings. It also provides a conclusion and recommendations for future research.

5. The fifth part of the report is a list of references. It includes all the sources used in the study and provides a brief description of each source.

6. The sixth part of the report is a list of appendices. It includes all the supplementary material used in the study and provides a brief description of each appendix.

7. The seventh part of the report is a list of figures. It includes all the charts and graphs used in the study and provides a brief description of each figure.

I. INTRODUCTORY

A. Statement of Problem

Witchweed, a parasitic seed-bearing plant that attacks corn, sorghum, sugarcane, and many other members of the grass family, was first identified in the United States late in 1956, when it was found in several North Carolina and South Carolina counties. In other parts of the world, it is an old problem, having been written about in Africa, Asia, and Australia since about 1790. It is a completely new pest in the United States, however, and much work yet remains to be done before its potential destructiveness can be fully appreciated. Observations that have been made to date indicate that it is a very serious pest and that crops in fields heavily infested with witchweed may suffer complete loss. Since this pest was not identified in the United States until late in the fall of 1956, the first objective was to make sufficient surveys in an effort to determine the extent of its spread in the two Carolinas and, also, to determine if it occurred in other states. By the end of the fiscal year, it had been found in four counties in South Carolina and in four counties in North Carolina.

B. Program Justification Statement

Witchweed has demonstrated its destructiveness in South Africa and other parts of the Old World, and it is seen as a definite threat to corn and other grains and grasses in the United States. While its geographical range is not known, it has been found to flourish in the latitude of the Carolinas and it may be that it could grow equally as well farther north in the important corn and other grain-growing states.

C. Program Objectives

The long-range aim of the program being initiated against witchweed is its complete eradication. Several methods undoubtedly will have to be employed to accomplish this result. Such methods will include the use of chemical herbicide treatments, as well as cultural practices, such as permitting land to lie fallow or growing trap crops or crops immune to infestation. Individual situations will dictate which method or combination of methods will be used. During the year covered by this report, the program consisted primarily of surveys in an effort to delimit the infested areas and to survey counties not known to be infested. Studies were initiated to develop chemical control plans and some work was done toward encouraging farmers to adopt cropping practices that would either eliminate witchweed, or at least keep it under control pending development of other research findings.

D. Changes

Since this is a new program, no changes were made. As the work progresses, however, it will, in all probability, be necessary to incorporate numerous changes in the program before an adequate control method has been worked out.

E. Status of Infestation

At the end of the fiscal year, witchweed infestations had been found on 12,074 acres in North and South Carolina--8,915 acres on 104 properties in North Carolina, and 3,159 acres on 53 properties in South Carolina. The infested properties in North Carolina were in Bladen, Columbus, Cumberland, Robeson, and Scotland Counties. In South Carolina, the infestations were in Dillon, Horry, Marion, and Marlboro Counties.

II. PROGRAM HISTORICAL INFORMATION

Extension Service Pathologists, Howard R. Garriss and J. C. Wells, of North Carolina first reported the occurrence of witchweed in the Western Hemisphere in Volume 40, Number 10, of the Plant Disease Reporter, issued October 15, 1956. Samples of corn roots had been submitted to the Plant Disease Clinic at North Carolina State College in July of 1956, and routine examinations of these specimens failed to reveal any commonly known parasite such as nematodes, fungi, or bacteria which could account for the diseased condition of the corn. Examining pathologists, however, noted portions of fleshy white and purplish underground stem-like structures bearing scale-like leaves entangled among the corn roots, and a graduate student from India who assisted in making the examination stated that these plant structures resembled underground stems of Striga species which are parasitic on sugarcane in the Eastern Hemisphere. Further studies by pathologists and botanists at the North Carolina Station definitely confirmed the identification of these plants as being a species of Striga. Witchweed has been found in western, northern, and southeastern Transvaal, northwestern Orange Free State, and almost the whole of Natal in South Africa. It is found primarily on the sandy soils and in light sandy loams in that continent.

It is not known how witchweed was introduced into this country or how long it has been in the general area now known to be infested. In discussing the weed with farmers in the infested area, some have stated that it had been present on their farms since 1950, and some even placed their initial observation as early as 1946.

III. PROGRAM ACTIVITY DURING FISCAL YEAR

A. Planning and Direction

Soon after witchweed was officially confirmed in North and South Carolina, plans were formulated in conferences between

2000

1. The first step is to identify the problem. This involves understanding the situation and the goals that need to be achieved.

[illegible]

1. The first of these is the fact that the majority of the population of the United States is now living in urban areas. This is a result of the process of urbanization, which has been going on since the beginning of the 20th century. The process of urbanization is the movement of people from rural areas to urban areas. This movement is caused by a number of factors, including the search for better living conditions, the desire for education, and the need for employment. The process of urbanization has led to the growth of large cities and the decline of small towns and villages. This has had a significant impact on the economy and society as a whole. The concentration of people in urban areas has led to the development of new industries and services, and it has also led to the growth of the middle class. However, it has also led to the problems of overcrowding, pollution, and social inequality. The process of urbanization is still going on, and it is likely to continue for some time to come.

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ANNA ARBUTHNOT (1632-1697)

26. 10. 1911. 1. 1. 1912.

1. The above information is classified "Secret" in accordance with the policy
of the Department of Defense and is to be controlled as such.

Division and State Plant Pest Control officials in North Carolina and South Carolina, and survey was begun immediately. Even though this was late in the season and just a few weeks before frost, witchweed was found on numerous farms in the two states. The program was placed under the immediate supervision of the area supervisor of the Carolinas, and much of the work was in connection with surveys and inspections being made for the other pests with which the Division and cooperating State agencies are concerned.

B. Technical Assistance

Various studies of the several phases of the witchweed problem were initiated and will be continued until many of the problems can be answered. These studies include methods of fumigating farm products to kill witchweed seed, testing various herbicides, cultural practices, etc.

C. Survey

Witchweed was definitely determined so late in the season in the Carolinas that it was impossible to carry on more than a limited amount of survey during the fiscal year because the witchweed plants do not come above ground usually until early or mid-summer, at best not until the latter part of the fiscal year. It was possible, however, to make surveys in Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina during the year; and 46,623 acres on 2,482 properties were surveyed or inspected. Witchweed was found on 8,915 acres on 104 properties in North Carolina and on 3,159 acres on 53 properties in South Carolina.

A close watch was kept on witchweed development in the infested areas of the Carolinas, and the following chronological development was reported by inspection personnel in that area. On March 23, witchweed attachment to roots of volunteer corn plants was observed; on May 24, some witchweed plants were found just breaking the ground surface; about May 27, the wilting was apparent on volunteer corn plants; on May 31, at a number of infestations, witchweed plants were found to be about a half-inch above the ground; on June 10, the first witchweed blooms were observed; by June 17, blooming was becoming general in most areas; and by June 27, damage to corn was severe in all infested areas.

Witchweed is detected primarily by its brick red or scarlet flowers, but occasionally they are yellowish red, yellow, or almost white. The flowers are rather small but are striking in appearance and are easily noticed after one has become accustomed to scouting for witchweed. The plants above the ground are small and bright green, and the green color has been described as having a yellowish tinge or "sickly look." The leaves are slightly hairy and the upper and lower surfaces are almost identical. The plants rarely grow more than 8 or 9 inches high; however, occasionally they reach a height of 18 inches.

The first part of the report deals with the general situation of the country and the progress of the work during the year. It is followed by a detailed account of the various projects and the results achieved. The report concludes with a summary of the work done and a list of the names of the persons who have contributed to it.

The second part of the report deals with the financial situation of the country and the progress of the work during the year. It is followed by a detailed account of the various projects and the results achieved. The report concludes with a summary of the work done and a list of the names of the persons who have contributed to it.

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D. Eradication or Control

At the end of the fiscal year some control had been started in the Carolinas, using herbicide sprays where plants had appeared above the ground on road shoulders and in noncultivated land. In addition, an all-out effort was made to encourage farmers to keep a sharp lookout for this plant on their farms and to destroy it immediately by plowing, hoeing, or spraying with recommended herbicides.

E. Regulatory

Agricultural representatives from North Carolina, South Carolina, and other interested states met with the Department of Agriculture officials at a public hearing in Washington on January 30, 1957, to consider the need for a Federal Quarantine against witchweed. In March, meetings were held by State and Federal Quarantine officials with various farm groups in the infested counties of the two Carolinas to determine boundaries of an anticipated quarantine covering all known infested areas and, also, to discuss cropping and marketing practices in the counties known to be infested, together with the movement of products, equipment, and other pertinent materials from the area proposed to be covered by the quarantine. Additional studies were made later during the fiscal year in an effort to prepare adequate descriptions of the infested properties in the Carolinas and also in order to determine the acreage of crops grown. It was found that the principal crops grown in the infested areas are cotton, tobacco, corn, small grain, and hay crops which include soybeans and field peas. Additional studies and surveys were made as the opportunity presented itself.

F. Methods Improvement

Since it was anticipated early in the program that a Federal Quarantine would have to be invoked to protect noninfested farms, counties, and states, studies immediately got under way in an effort to develop sterilization or fumigation methods that would kill the seed in order to permit movement of products, machinery, etc. from infested farms. Witchweed seed are very small, almost microscopic, and a single plant may produce several hundred thousand. It has been estimated that larger plants may produce as many as a half-million of the tiny seeds. Various studies also were initiated to assist farmers in orderly marketing of their crops by following certain phytosanitary practices. Plans for the 1958 fiscal year include numerous additional studies of methods of adequately protecting farm products from contamination with the small witchweed seed.

G. Other

The various phases of the witchweed program were carried out in very close cooperation with State Plant Pest Control agencies, Extension Service, Experiment Station workers, and the farmers, as well as with the private or commercial concerns and individuals either directly or indirectly concerned with various farming interests in the infested areas.

The first part of the report deals with the general situation of the country and the position of the various groups. It is a very general and superficial treatment of the subject, but it is necessary to have a general idea of the situation before going into the details.

Section 2. The situation in the various groups.

The second part of the report deals with the situation in the various groups. It is a very detailed and thorough treatment of the subject, and it is necessary to have a general idea of the situation before going into the details. The first group is the group of the ... The second group is the group of the ... The third group is the group of the ... The fourth group is the group of the ... The fifth group is the group of the ... The sixth group is the group of the ... The seventh group is the group of the ... The eighth group is the group of the ... The ninth group is the group of the ... The tenth group is the group of the ...

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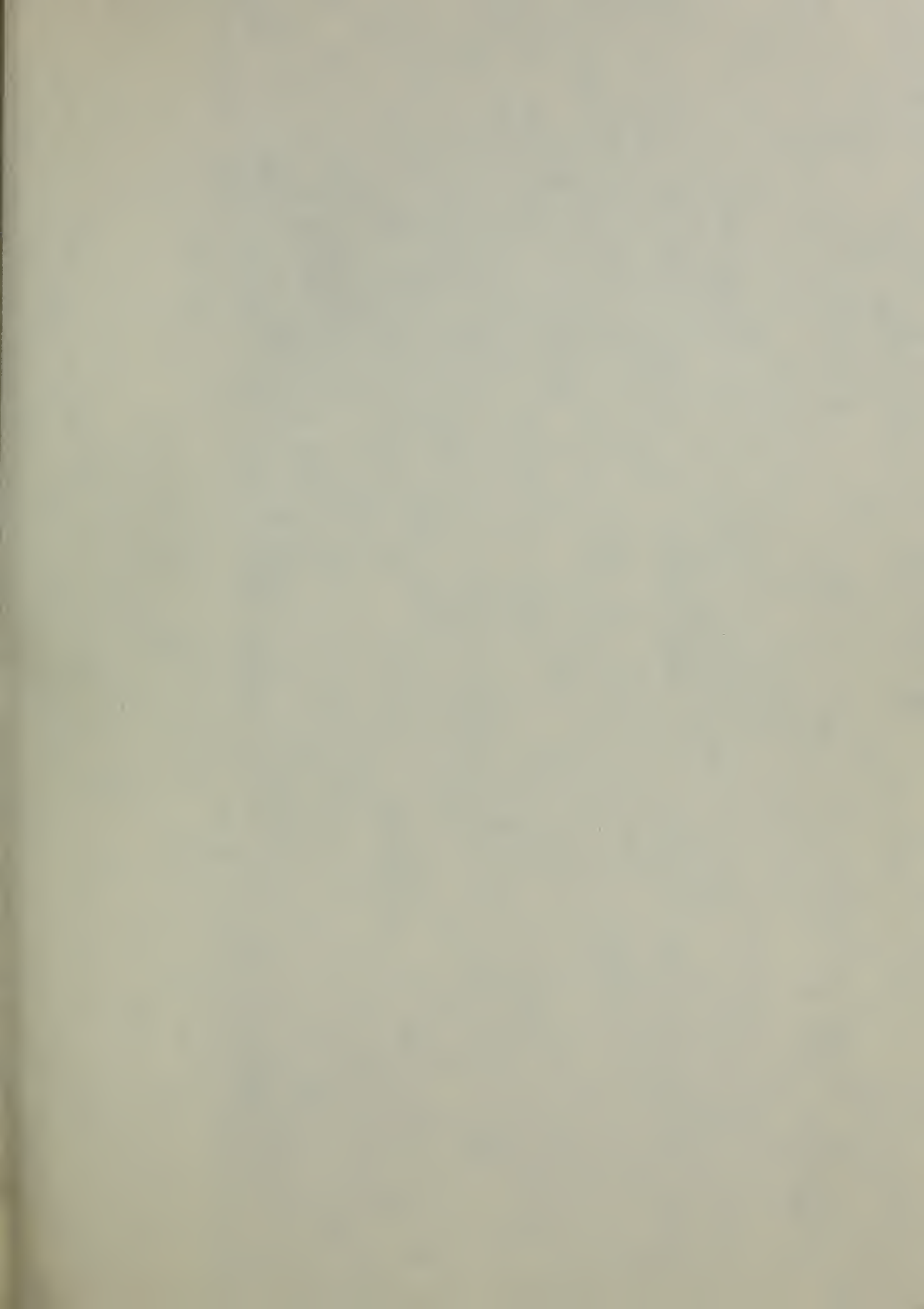
Section 4. The situation in the various groups.

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TABLE I. WITCHWEEED SURVEYS

FISCAL YEAR 1957

| State | Survey | | Infestations Found | |
|----------------|------------|--------|--------------------|--------|
| | Properties | Acres | Properties | Acres |
| Alabama | 219 | 3,679 | 0 | 0 |
| Florida | 263 | 19,913 | 0 | 0 |
| Georgia | 1,610 | 15,271 | 0 | 0 |
| Mississippi | 75 | 635 | 0 | 0 |
| North Carolina | 234 | 3,469 | 104 | 8,915 |
| South Carolina | 81 | 3,656 | 53 | 3,159 |
| Totals | 2,482 | 46,623 | 157 | 12,074 |





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